ARCHAEOLOGICAL EVIDENCE REGARDING DIET ON THE NORTH KENYAN SWAHILI COAST BETWEEN Ca. 8TH AND 17TH CENTURIES A.D.

BY

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university.

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This thesis has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

To my loving mother, Tabitha Osewe who made a way out of no way. Thank you mum.
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ABSTRACT

This thesis examines the archaeological evidence on the Swahili people dietary practices between Ca. 8th and 17th centuries A.D. The study analyzes the extent to which the environment influenced the procurement of food on the north Kenyan Swahili coast. The study adopts a model which relates the Swahili dietary system and economic strategies to the local environment based on culture history.

Evidence for this study draws from the 1987-88 excavations carried out at Ungwana by George Abungu as well as the 1980-84 excavations at Shanga by Mark Horton. Data from ethnographic observations and documentary accounts were also examined. An in-depth study of the ecofact from Ungwana and Shanga was carried out. Further, faunal analysis of the excavated materials from the aforementioned sites was undertaken.

Evidence adduced from the research carried out indicate that there was lack of direct floral remains. However, ceramic and non-ceramic finds offered "indirect" yet worth evidence of the use of crop foods in the Swahili dietary system. In most cases, the inferences made from the floral evidence about the existence of certain foodstuff among the Swahili concurs with similar assertions of the early historical accounts and ethnographic observations. There are however, discrepancies in some of the type, quantity and place where the foods are reported. The study further asserts that, the
Swahili dietary system was a blend of agricultural, pastoral, marine and game resources. Therefore, the Swahili can no longer be seen narrowly as being either of agricultural or pastoral origin only. Evidence yielding from this study indicate that proteinous foods like fish which were hitherto considered an insignificant component of the Swahili diet were indeed popular among the community. The presence of certain types of foods probably not eaten by the Swahili communities but within Swahili settlement confirm the coast-interior interaction thesis in terms of economic symbiosis and social intercourse.
CHAPTER ONE

1.0. INTRODUCTION

This chapter spells out the parameters of the study. The chapter contains an introductory section, the Geography of the north Kenyan Swahili coast, ethnic composition of the area under investigation, statement of the problem, objectives of the study, justification and significance of the study and finally scope and limitations of the study.

The Swahili community of Kenya occupy the Kenyan Coast which stretches from Ishakani, about 10°40's 41°05'E in the north to Vumba Kuu, about 4°40's 30°03'E in the south (see Figure 1). Generally, the Kenyan Coast forms part of the history of the East African coast which extends from Somalia to Mozambique.

The Swahili community has played a prominent role in the history of Kenya and, indeed, Africa. The community has its own unique interesting history. The group has a rich and diverse cultural heritage as a result of its strategic location at the coast. It commands an immense influence of both continental and oceanic activities embodying trade, pastoralism, agriculture, mixed farming and fishing. The other coastal peoples (close relatives to the Swahili) to share in this spectacular cultural heritage are the Mijikenda and the Pokomo. The most significant environmental feature in the Swahili way of life is the Indian Ocean. The influence of the ocean on the history of the Swahili community is tremendous. Indeed, an outstanding feature among the Swahili community is their unique and dynamic dietary habits. Who then form the Swahili community? This is the precise concern this study, albeit it concisely avoids any detailed discussion
Figure 1: Archaeological sites of the Kenyan Coast
on the controversies in which the Swahili definition is engulfed. The relationship between the Swahili, the Mijikenda and the Pokomo is thus fully addressed to.

1.1. The Geography of the North Kenyan Swahili Coast

1.1.1. Geographical Position

The north Kenyan Swahili coast has been taken, for the purpose of this study, to be the coastline from Ishakani in the north adjacent to the Somalia Republic border, about 1°40’s and extending to the mouth of the Tana river, about 2°30’s, a distance of about 160km. The coastline includes the Lamu Archipelago, delta sites of Ungwana, Shaka and Mwana and the Bajun settlements (see Figure 1).

1.1.2. Physiography

This is a flat plain of sedimentary rocks which slopes downwards to the sea. To the west of the coastal region are the Duruma-Wajir Lowlands, the foreland plateaux and the volcanic massifs of the Eastern Kenya Highlands (Ojany and Ogendo, 1973.) Along the coastal plain are bands of sand dunes; the Mundane Range and the fossil dunes which rise up to 200m high. There are also young wave-like dunes both on the mainland and islands. The coastline is characterized by long thin islands that run along the shore. The islands of Pate, Simambaye, Manda and Reefs are examples of settlements which have formed over sandstone ridges. Pate and Manda, however, are larger islands of this category. Lamu’s case would appear somewhat different because there is evidence of
sandstone around its foundations. This has led some people (see Horton, 1984) to suggest that they were formed as a result of an alluvial deposition on a delta complex.

1.1.3. Climate:

The area can be said to have a savannah climate with the rainfall pattern influenced, to a large extent, by the seasonal south east and north east monsoon winds across the Indian Ocean. The south east moisture laden monsoon winds (the Kussi) blow from April to November and form the source of the long rains (Masika) with its maximums between April and June. During this time Lamu receives an annual rainfall amount of 895111111 and is rather evenly spread in most parts of the coast. The relative humidity, however, fluctuates a lot; at dawn it reaches 75% while it realizes upto 86% in the later part of the day. The annual mean temperature falls between 24.1°C - 29.1°C - being the coolest months at the coast.

The warm dry north east monsoon winds (the Kaskazi) blow from November to March, causing short rains spell (the Vuli) which is often both unreliable and unevenly distributed. To the south west of Lamu, the annual rainfall is above 1000mm, but to the northeast and inland, the annual amount received falls drastically. In the area around the Kenya/Somalia border the mean annual rainfall is about 700mm (Ojany and Ogendo, 1973; Horton, 1984). The months of March and November are the hottest with temperatures rising to between 30°C - 32°C. However, the diurnal and annual ranges of temperatures are relatively low (Morgan, 1973; Meffert, 1980).
1.1.4. Drainage:

The north Kenyan swahili coast has a very simple drainage system adjusted to the original slight slope to the east. The area’s main rivers are the Tana and the seasonal Ewaso Nyiro. Both have their sources in the central Kenya highlands (Mt. Kenya and Nyandarua). The Tana river pours its waters into the Indian Ocean at Kipini. There are also creeks such as the Dondori and Mongoni on the mainland opposite the Lamu Archipelago. The Ewaso Nyiro, although it ends up in the Lorian swamp today, it originally reached the Indian Ocean along the Dondori Creek and further north in the Somalia Republic at Burgao (Haywood, 1927) (Figure 2).

The Tana river has changed its course in the recent past. It had a much wider delta than at present, extending from Karawa to Kipini, with further tributaries at Mpeketoni and Mongoni creeks (Ylavisaker, 1979; Abungu, 1989). The lower Tana is an area of continued deposition in which annual flooding is common. Fresh water is obtained from the wells dug around the settlements.

1.1.5. Soils:

The soils show a great deal of variety. The river valleys have very rich and productive soils. However, around the mouth of the Tana the soils are waterlogged leading to the formation of a swamp. Other areas have loose sandy soils which are highly porous and very unproductive. The former Pleistocene coral reefs have thin Calcareous soils while the former lagoons have dark clay loams. Furthest inland are the Jurassic and Cretaceous sandstones (Morgan, 1973; Ojany and Ogendo, 1973).
1.1.6. Vegetation: 

Like most parts of Kenya, the coastal vegetation has been greatly exploited by man. Rainfall patterns and soil types, influence to a large extent the kind of vegetation found in the north Kenyan Swahili coast. In the River Tana floodplain where soil is generally fertile, a dense wooded vegetation was supported. Today, the former dense wooded vegetation has been reduced to patches only due to clearing for agriculture.

The islands and the mainland north of the River Tana have poor soils that support dry woodland savannah vegetation. The moisture laden south east monsoon and the water supply from the creeks along the coastal strip offer favourable conditions for the thriving of a dense lowland wet forest vegetation. This vegetation has greatly been affected by soil erosion along the shore-line, but the areas around Witu have preserved the original forest. Deciduous grass and trees are sustained in places (immediate hinterland of the coast) with loose soils and less rainfall. There are also coconut and Baobab trees. On the mainland opposite the Lamu Archipelago and Bajun settlements, there are mangrove swamps which are affected by tides (Morgan, 1973).

1.2. The Swahili:

The Swahili people are found spread from southern Somalia to northern Mozambique, including the offshore islands of Lamu Archipelago, Pemba, Zanzibar, Comoros, Kilwa and northwestern Madagascar. Along the Kenyan Coast, the Swahili occupy the area between Ishakani in the north and Vumba Kuu in the south. At present, the area is populated by the Swahili community, Mijikenda, Pokomo, Orma, Sanye, Boni...
(or Aweera), Waata (or Ariangulu) and the Dahalo. Oral traditions, linguistics and archaeology lend supportive evidence for centuries of clear interaction between and amongst these people (Ehret, 1974; Nurse & Spear, 1985; Horton, 1984; Mutoro, 1987; Abungu, 1989). This study does not however discuss all these ethnic groups, instead it concentrates on the Swahili community; the Mijikenda and the Pokomo who linguistically belong to the northeastern coastal Bantu and have a common origin pointing to the unidentified mythical Shungwaya area are also discussed. Shungwaya is widely believed to have been in the present day southern Somalia republic (Guillain, 1856; Spear, 1978; Nurse & Spear, 1985).

The definition of the Swahili community in terms of their cultural and economic origins had in the past been enshrouded in serious controversial debates such as foreigners, mixed breed of Arab men and Africans, African origin, among other hypotheses and theories. This controversial debate has now fizzled out with the realization that the Swahili community are indeed of African origin. The Swahili community is then defined here as an original Bantu group of people who made their homes in and around the coastal towns of the East African coast. Identifying themselves with such towns, are the WaPate, WaMvita, Wakilifi, WaMtwapa, Washaka, WaGunya, Wakatwa, WaFaza, WaJomvu, Wakilindini, Wachangamwe and WaTangana, among others.

The Swahili community initially spoke a proto-northeastern Bantu language known as Kingozi (Guthrie, 1967) and have inherited or adopted the swahili language (Ki-swahili) as their preferred mother tongue (Abdulaziz, 1979; Middleton, 1992; Allen,
Figure 2: The Geography of North Kenyan Swahili Coast
Kiswahili is today spoken in several dialects such as Ki-mvita, Ki-Tikuu, Ki-Amu, Ki-Pate among others. One thing to note therefore in the definition given above is that Islamic influence in the Swahili culture has been down-played. It is not to deny the fact that Islam was (and still is) important, but it must be understood first that the Swahili were traditionalists who firmly believed in the spirits of their own particular lineage or clan ancestors (Nurse and Spear, 1985). When they adopted Islam around the 9th century A.D., they did not accept everything. The Arab-Islamic component did not therefore, superimpose itself nor undermine the already existing coastal culture. Islam only acted as a stimulus to further development of this mostly urban-based African culture.

1.3. The Mijikenda

The Mijikenda are linguistic cousins to the Swahili. Together with the Pokomo, they belong to the Proto-north eastern Bantu language cluster. The Mijikenda inhabit the immediate hinterland of the coast. The term Mijikenda literally means nine "tribes" which include the Giriama, Digo, Ribe, Kauha, Jibana, Duruma, Rabai, Chonyi and Kambe. As noted earlier the mythical Shungwanya (area of origin) is regarded as the original home of the Swahili community/people, the Mijikenda and the Pokomo (Spear, 1978; Mutoro, 1987). The Mijikenda are predominantly farmers and are better known for their Makaya structures.
1.4. The Pokomo

The Pokomo presently occupy the area around the Tana Delta; and, extend up to about 200Km inland along the river. They are also essentially an agrarian community who cultivate along the banks of the Tana River. Tana river is the lifeblood of the communities living along and around it which they also use for fishing and transportation purposes, particularly in its lower section (Abungu, 1989).

1.5. Statement of the Problem

Very little has been done concerning the Swahili diet. The documentary accounts relating to the coastal diet are in the form of remembered traditions and mostly they were written by the early visitors to the East African Coast who collected their evidence at second hand or were in Eastern Africa only briefly. These accounts have interpretive problems due to the ambiguous and confused manner in their arguments, so over-relying on them as at present, as the only written account of coastal diet is deficient.

In this work the investigator will use archaeological materials to prove the authenticity of the documentary accounts. Despite their abundance in archaeological record, faunal and floral as well as other food related objects have so far not been adequately studied. Given this fact, it is only when the early sources are examined in the light of the emerging archaeological evidence that a more accurate history of the Swahili diet can be documented. The study will also attempt to examine archaeological field materials available with the help of other sources to attempt to reconstruct the Swahili diet. Archaeological evidence provides a method of testing the validity of the
early historical accounts. Already archaeological evidence relating to some studies (e.g. Horton, 1984) has shown that the early documentary accounts dealing with early coastal society must be re-examined.

This is, therefore an archaeological study relating to the trends in the Swahili dietary practices.

1.6. Objectives of the Study
1. To establish and periodise using archaeological evidence, the dietary practices of the Swahili people.
2. To examine the role played by the environment in affecting the quest for food.
3. To trace and establish the main food sources for the Swahili people between 8th-17th centuries A.D.

1.7. Justification and Significance of the Study

The chief justification of the study lies in the use of archaeological materials as the main source so as to provide new evidence about the earliest Swahili diet. Food plays an important role in the socio-cultural, economic and political organization of a people. For most of human history the daily preoccupation of human beings has been structured by activities related to various aspects of the quest for food (Kiriamat, 1992). Food is so important that some archaeologists, e.g., Tobias (1985) have even argued that the way food is collected and carried "home" helped to differentiate man from apes.
The study has discussed the coastal geology and ecology, and this has helped us to understand the dietary system and even settlement distribution along the Kenya coast. Ecological diversity offers opportunities to human and non-human life alike to exploit their natural environment.

A major object of archaeology is to study the ways in which people have solved the problems of making a living and adapting to their environment. The study of diet is an integral part of this objective.

The question of urbanization in Eastern Africa as a whole, especially the duration of occupation of centres can be addressed using diet-oriented research. For instance, how does food supply contribute to the settlement of an area? How does food abundance or shortage affect the period of occupation of a settlement? This may help to explain spatial organization of any significant settlement at the coast during this period under investigation.

1.8 Scope and Limitation of the Study

The north Kenyan Swahili coast has been chosen as the area of study because a greater concentration of studies has taken place here in comparison to other areas of the Kenyan coast. It is also in the north Kenyan Swahili coast that there are some of the earliest inhabited coastal settlements which date as early as the eighth century A.D. Therefore, the sequence of the north Kenyan Swahili coast has wider implications for the rest of the Swahili coast.
Further, the north Kenyan Swahili coast lies at the crossroads of several overseas and continental zones covering the lowland wet forest and the dry savannah. It is thus a junction of diverse economic and cultural interactions, e.g., agriculturalists, hunter-gatherers, pastoralists, fishing people and traders. This is not replicated anywhere else on the Kenyan coast.

The study is mainly limited to the faunal and floral remains as well as other food related artifacts from two north Kenyan Swahili coast sites, Ungwana materials excavated by George Abungu in 1987-1988, and Shanga materials excavated by Mark Horton in 1980-1984. A lot of dietary data of variable quality is available but there has not hitherto been specific analytical study on them.

Chronologically, the study focuses on the period between the eighth and the seventeenth centuries A.D. This time-scale has been chosen to suit the period when the two sites under investigation were inhabited and abandoned (e.g., Shanga 8th-15th century and Ungwana 10th-17th century).
2.0. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. Introduction

This chapter is divided into two parts: The first part is the Literature Review, while the second part is the Theoretical Framework.

2.2. Literature Review

There is a considerable wealth of literature concerning the Swahili Coast. These are in the form of early historical accounts, oral traditions, linguistics and archaeological sources.

Early Historical Accounts

The first source is the *Periplus of the Erythrean sea* written in the first century A.D. by an unknown merchant (Stigand, 1913; Gervase et al., 1963; Chittick, 1974; Huntingford, 1980; Cusson, 1989). It documents the presence of Arab and Indian traders on the coast of East Africa. It argues that some indigenous people were at least intermittently hunting, gathering, herding and farming along the coast when the first foreign visitors came by sea to the area. The next to appear was Ptolemy's *Geography* written around A.D. 150. Ptolemy gave place names on the East Coast, but most of these places and names given in his account cannot be traced using modern geography (Stigand, 1913). Although these accounts appear to be of value, they have some
interpretive problems; for instance, they were written by foreigners who used secondary sources or who were only briefly in eastern Africa. The information contained in each source is scattered/fragmentary and must be made use of with great care. These were eyewitness accounts and partly based on information in Southern Arabia.

A ninth century Chinese account described Bobali town (probably on the Somalia or north Kenya coast) as where the local inhabitants drank raw blood mixed with milk. The local inhabitants "stick a needle into the veins of cattle and draw blood, which they drunk raw mixed with milk" (Duyvendak, 1949: 13). This practice is, however, not unique to the coastal people, other Kenyan communities, e.g., the Maasai, also practise it.

In the tenth century Al-Masudi wrote Munyi adh Dhahal (Meadows of gold and mines of Gems). In this account he wrote of cattle being used as beasts of burden by the Zenj as well as being ridden in war, but he does not tell us exactly where. The reference of cattle being used as beasts of burden is puzzling. It may be that al-Masudi was misinformed. Masudi also refers to whaling and other forms of fishing (Stigand, 1913:14; Freeman-Grenville, 1962:14). The staple food of the coastal people according to al-Masudi was millet supplemented with a type of Yam called "Kalari" (Freeman-Grenville, 1966:16). He also stated that the Zenj ate bananas (Ferrand, 1913:175 quoted in Horton, 1984; Johnson, 1939: 332).

In the twelfth century, Zhongli is described as a pastoral settlement whose inhabitants kept large herds of cattle and sheep. These animals could only be slaughtered on special occasions. One of their delicacies was small birds and they were caught using
nets (Duyvendak, 1949:21). In Bibalo the inhabitants ate camel meat and milk; there was also the presence of sheep, but it is not mentioned whether they were eaten or not. But in Zengba it was sheep which was eaten most, like for al-Masudi, camels were absent (Hirth and Rockhill, 1911:126, 128). Al-Idrisi’s account which appeared in the same century emphasized the importance of fishing to the coastal communities. At Mulanda (probably Manda or Malindi) the local inhabitants salted and sold their catch (Lewis, 1974:118). At Budhuna fish, shellfish, frogs, snakes, mice and lizard with the Arabic name of Umm Hubayan-probably the monitor lizard-were eaten. At Bazawa (probably Barawa) fish-oil was of ritual importance as it was used to anoint standing stones (Lewis, 1974:117-118). Al-Idrisi also noted the presence of sorghum and sugarcane; These crops had also earlier been noted by Abu Zaid al Hasan (Horton, 1984). Rice was noted on the islands of Djawaga (probably Comoros islands), and on the mainland by Al-Idrisi (Freemen-Grenville, 1966). Marco Polo described the coastal people as a community which lived on milk, dates and flesh, though he does not say which type of flesh (Ibid). The towns of Zhongli, Bibalo, Zengba and Budhuna have not been identified with any modern towns along the East African Coast.

Al-Idrisi also gave the local names of the five main types of bananas eaten at the coast; Omani (from Oman), Muriyani, Kondi, Sukari, and Fili. Two of these names survive in modern swahili as common types of banana grown - Kondi and Sukari (Ferrand, 1913:175, Quoted in Horton, 1984; Johnson, 1939:332). But despite all these dietary information there are difficulties in understanding al-Idrisi’s accounts of East African coastal communities.
Africa. He was very mixed-up and confusing in his argument, for instance he argued that the African coast extended continuously to South East Asia.

In the fourteenth century, Ibn Battuta dined upon fish, chicken and meat (type not mentioned) at Mogadishu. He did not eat mutton but noted the presence of sheep (Gibb, 1962:376). He described the domestic fowl at Mogadishu as being spotted (Freeman-Grenville, 1966). He saw bananas being cooked unripe in milk (Gibb, 1962: 376) and the bananas were up to a cubit long as described by Abu al-Mahasin. The fruits were picked and kept for over a year (no reason given for that practise) (Horton, 1984). Ibn Battuta described the island of Mombasa as where the local inhabitants did not sow grains. He did not say what they subsisted on. At Mogadishu he saw mangoes and citrus fruits and the Indian fruit eugenia jambolata at Mombasa (Gibb, 1962:376).

Early fifteenth century Chinese description of Barawa noted that the country was agriculturally unproductive and so fishing provided the bulk of the food source (Duyvendak, 1939). As early as 1606 Gasper de S. Bernadino recorded the hunting and consumption of dugong at Siyu on Pate island (Freeman-Greenville, 1962:163); turtle fishing was the occupation of the Bajuni (Elliot, 1925/6; Grottanelli, 1947, 1955), and at Mogadishu, horses, sheep and camels were fed on dried fish according to eye-witness Chinese accounts (Duyvendak, 1939).

Portuguese sources recorded that cattle, camels and fat-tailed sheep were abundant at the coast; for instance, when they sacked Mombasa in 1505, they captured cattle and camels. Malindi in 1517 was described as a town with "plenty of round-tailed sheep, cows and other cattle" (Freeman-Grenville, 1966:110, 132). The Portuguese also
referred to chickens at Mombasa and Malindi (Freeman-Grenville, 1966:57,63,132); these sources add dates, figs, pomegranates and vegetables as part of the coastal diet. Coconut was an important component of the diet of the Lamu Archipelago. Al-Masudi also had earlier noted coconut in the tenth century (Freeman-Grenville, 1966:17). Bread was reported absent in the coastal diet (Freeman-Grenville, 1966:63), yet Barbosa (De Barros in Kirkman, 1966) noted that there was wheat imported from Cambay to Malindi.

The historical evidence of diet covering the early period is ambiguous. Many of the place names given in some of these early accounts cannot be traced with the modern geography. For example, Al-Masudi talked of Kanbalu or Qanbalu as the main trading centre along the East African coast, but several locations have been argued for Kanbalu/Qanbalu. These include Zanzibar, Pemba, Madagascar and Comoros islands (Pearce, 1920; Trimingham, 1975). Most of these accounts are mixed up and as such very confusing. These sources, particularly the Chinese accounts, because they are not first hand, are of much less importance to us than archeological evidence. These sources tell us little of the coast save in connection with travel and trade.

The Portuguese sources appear to be more comprehensive than the Greeco-Roman collections, but also none of them, e.g., Jaao de Barros, Tome Pires and Duarte Barbosa personally visited Africa (Freeman-Grenville, 1966:127). Portuguese eyewitness accounts of the early period have survived from clerics, such as Father Dos Santos, Gasper de Santo Bernadino and Monclaro (ibid, 138-164) which are useful but very brief.
Linguistic Sources

Linguistic sources on the Swahili communities have always been closely connected with that of the Pokomo and Mijikenda. The Swahili together with the Mijikenda and the Pokomo belong to the proto-north eastern Bantu language (Spear, 1981; Nurse, 1985; Nurse and Spear, 1985). Related work on Eastern and Southern cushionic language families has provided additional information to reconstruct the way in which Bantu language speakers related to other groups along the coast (Ehret, 1974). The Swahili communities along the coastal region have been linked with the Early Iron Age (Chittick, 1969; Spear, 1981, Nurse and Spear, 1985; Abungu, 1989). People who have acquired iron knowledge must be highly technical in using iron equipment to procure food. The Swahili vocabulary (Nurse and Spear, 1985) offers evidence of fishing of a variety of sea-foods using hooks and line, harpoons, nets and basket traps.

Linguists have argued that the proto north eastern Bantu could have settled in the area between the Benadir region (the Juba river region) and Tana River in the second half of the first millennium A.D. (Heine, 1978; Nurse, 1982a). The region is today inhabited by the Eastern and Southern cushionic speakers. Linguistic evidence is very useful as it provides additional information to help reconstruct the way in which Bantu language speakers related to other groups along the coast (Ehret, 1974). However, languages sometimes do not necessarily correlate to either ethnic groups or distribution of archaeological materials. Hence, the limitation of the former.
Oral Traditions

There are also traditional histories about the Swahili, viz., official chronicles and oral traditions. Both can be used to reconstruct the dietary behaviour of the Swahili. The Lamu chronicle, for instance, records that the town was a leading exporter of coconuts to India (Stigand, 1913). Swahili oral traditions as recorded by Kirungu (1943) and Abungu (1989) tend to suggest that the proto-northeastern Bantu came from the mythical Shungwaya, apparently a rich agricultural area in the present day southern Somalia (Horton, 1984; Mutoro, 1987; see also Ehret, 1984). This would then appear to suggest an agrarian connection with the Swahili and their linguistic cousins. The Jomvu oral tradition, on the other hand, records that the Mombasa town dwellers were both pastoralists and cultivators (Chittick, 1984; Abungu, 1989). This then points to the earliest settlements as being mixed farming villages whose food source was from farming and livestock keeping. This oral tradition would then tend to contradict Ibn Battuta's observation (Gibb, 1962:376).

Most of the traditional histories have been brought together in the form of continuous narratives, which are highly dependent on memory. Chronicles can help to reconstruct history but they are often an unreliable source of information because the authors are court poets or singers who usually exaggerated the family history or status of a town. Pate, Lamu and Mombasa chronicles were compiled only in the nineteenth
century, therefore, they should be very cautiously made use of. The Pate chronicle, for example, appears in several versions and thus is difficult to understand (Freeman-Grenville, 1962; Chittick, 1963, 1965, 1969a). Nevertheless, the traditional histories are useful as they contain information about origins of the society (particularly, dynasties and towns) and the relationship between contemporary society and past activities.

Archaeological Sources

Archaeological research on the Kenyan Coast, and indeed on the East African Coast was initiated in 1948 by the then Trustees of National Parks, when they engaged James Kirkman to excavate the ruined city of Gede. Other settlements such as Kilipa, Mnarani, Kinuni, Ungwana and Fort Jesus were also excavated. The sites yielded artifacts ranging from Chinese porcelain, eating bowls to glazed earthware dishes. In all, Kirkman tried to suggest a substantial Arab influence at the coast (Kirkman, 1948, 1952, 1957b, 1964, 1966). This quotation from his book "Men and Monuments of the East African Coast" sums up clearly his views:

The historical monuments of East Africa belong not to the Africans, but to Arabs, Arabized-Persians, mixed in blood with the Africans but in culture utterly apart from the African who surrounded them (Kirkman, 1964:22).

More recent excavations and interpretations (Ogot, 1978; Mutoro, 1979, 1987; Horton, 1984; Nurse and Spear, 1985; Pouwells, 1987; Abungu, 1989;) reject this view and in fact argue that the coastal Africans lived in the coastal towns prior to the coming of the Arabs and their culture. What is important here to note is that Kirkman carried out long
and extensive research works at the coast but never discussed its dietary practices. But, the artifacts he found could help explain some facets of dietary practices if analyzed in a specific dietary study such as this one.

Chittick (1965, 1977), like Kirkman, saw the coastal settlements, historical monuments, culture and architecture as the works of Afro-Arab culture and described the process of coastal settlement with exceptional clarity:

"The cities of the coast were primarily Islamic and their way of life mercantile. The springs of this civilization are to be found on the northern seaboard of the Indian Ocean. But it cannot be said to be Arabs, the immigrants were probably few in number, and there would have been far fewer women than men among them. Though, at present time, they may have shown a preference for women mainly of Arab extraction, most Arab men must have married Africans, or women of mixed blood, and their stock rapidly became integrated with the local people (Chittick 1977:218)."

According to Chittick the coastal culture was an alien graft by foreign merchants who settled in these coastal areas, and may even have founded some of their own. These settlements clung to the coast, and had very little contact with the hinterland. In them African loyalties and customs were mixed with the wider culture and loyalties of Islam (Chittick 1977: 187). But, the Afro-Arab model did not overcome a number of fundamental Swahili historical problems by then, e.g., definition and identity. Jim Allen, the late coastal historian, did extensive research work on the Swahili coast of Kenya through the study of material culture in the Lamu region. Allen arrived at several conclusions concerning the indigenous Swahili people and their culture:
among them. Allen believed that the Swahili people had strong trade patterns with the interior communities. Such products as ivory and animal skins must have come from the interior sites (Allen, 1974). Abungu (1989) and Abungu and Mutoro (1993) lend supportive evidence to the coast-interior thesis. Some of Allens’s conclusions, although tentative, may help shed some light on further studies and dispel some of the errors in interpreting the archaeological materials found in some coastal sites.

Garlake (1966:2) like Kirkman, advanced the theory that the Swahili is a culture that was initiated by the Arabs and that the coastal monuments, particularly Lamu were "nourished by some sort of umbilical cord leading back to Asia". But this thinking has now been challenged by several scholars (Allen, 1974; Ogot, 1978, etc.)

Mutoro (1979) carried out archaeological excavations at Takwa. The excavations yielded ceramic, non-ceramic as well as faunal assemblage and will provide important information on the dietary practices. Phillipson (1979) investigated the sites of Wenje, Goloyo and Lake Bilisia. The aim of his investigations was to look for evidence on the early settlement of the lower Tana and the northern Kenya coast. Abungu (1989) on the other hand, when considering evidence relating to settlements of the northern Swahili coast found a lot of useful data which the present author analysed in relation to the dietary practices of the Swahili people. Horton (1984) developed a general model in order to try to establish the social and economic organization of the early coastal settlements in the northern Swahili coast. Horton and Mudida (1993: 680-682) attempted faunal and floral analysis of Horton’s excavated materials so as to understand the Swahili past
subsistence strategies. But their analysis seems largely inconclusive and they suggest that more analysis of faunal material from sites along the East African Coast need to be conducted further. However, this effort is a benchmark to the undertaking of a specific dietary practice of the Swahili. These materials were also analysed for this study.

Pouwells (1979) described Lamu town as a fishing and trading centre where bulls were slaughtered. He also noted that all Swahili were expected to eat using the right hand as a show of mmgwana (civilization) and adabu (manners) (ibid: 236). However, his work was more of ethnographic rather than archaeological.

Donley (1984) asserted that every Swahili ate fish and other meats such as chicken, goat, sheep, beef and small birds. Such assertion is questionable because we know of the Katwa (a Bajuni group) who do not eat fish. Donley’s research was also more of an ethnographic study than an archaeological one. Nonetheless, it offers some interesting information about the present Swahili diet.

Salim (1978) argued that the Swahili diet was varied as their culture. He argued that agriculture was the mainstay of the Swahili diet. Crop foods were supplemented by animal products as well as sea-foods. Salim’s work, though historical, can provide a basis for the development of a specific archaeological study of Swahili diet.

Wilding (1977) studied ceramics of the northern Kenyan coast and came up with a comprehensive collection of both continental and overseas pottery. His work is useful because pottery studies have great relevance to the study of diet since most, though not
All food utensils were made of clay, e.g., serving dishes, cooking pots, water jars and pots, and storage facilities. Wilson (1978, 1980) noted that most of the coastal settlements and towns were villages of fishermen and farmers but he does not go far enough to elaborate on these subsistence strategies. Kusimba (1993) on the other hand, assembled and interpreted archaeological, ethnographic and archaeometallurgical data in an attempt to reconstruct and understand the contributions of iron working technology to the development of Swahili settlements along the coast while Ndiiri (1992) undertook an ethnoarchaeological study of contemporary local pottery on the Kenyan coast, with a focus on the manufacture, consumption and discard of contemporary local pottery.

Berg (1968), Sheriff (1975) and Donley (1982, 1986) have done much work of documentation of coastal life. Their works offer important data only on the economic systems, technology, art, history and cultural affinities of the coastal communities.

From the literature review discussed above, it is clear that nobody has carried out archaeological analysis of the dietary practices at the coast. The Greco-Roman collections, Chinese accounts, Portuguese accounts as well as historical linguistics and traditional histories have limitations in their application or reliance as sources of the Swahili diet. On the other hand, there are sufficient archaeological materials which have been found in the coastal sites that can be of great value in understanding the Swahili diet.
2.3 Theoretical Framework

A number of theories have been proposed by archaeologists for analysing data but, I only deal with some of them. The first of these is the culture-historical approach developed in studying cultures in continental Europe. This approach was propagated mainly by the Austro-German school of anthropological geographers (1880-1900) led by Frobenius and Ratzel. They were concerned with the mapping of cultural attributes and the correlation of the distributions with environmental variables. They argued that the origins of various cultures can be examined chronologically by studying the artifacts available.

Later, some anthropologists like Boas, Wissler, Kroeber, Huntington, Knoll, Luning and Baker took up the approach (see Hodder, 1982:2). However, the first person to systematically apply the term culture to archaeology was Gustaf Kossinna (Hodder, 1982) who argued that artifacts represented cultures which in turn reflected ethnicity. These views met serious criticisms because a culture could yield numerous artifacts and this could not indicate the existence of different ethnic groups. The Swahili settlements have also yielded a lot of artifacts and applying this theory would mean assigning the different artifacts to different ethnicities.

The anthropologist, Branislaw Malinowski and archaeologists like Clark (1968), Childe (1950, 1951) and Steward (1955) applied the functionalist approach in their studies. The functionalist approach was important and it arose as a result of the deficiency of culture historical approach. The functionalists were interested in understanding the function of artifacts. While Malinowski and his followers stuck to the
functionalist approach to explain their concept of culture, A.R. Radcliffe-Brown (see Berry, 1976) became the chief propagator of structural functionalism. In structural functionalism, a culture is viewed much like a living organism in which all parts are independent and yet supportive of each other. But the functionalist approach has the bias of stressing only how artifacts functioned and not the origin of cultures. The Swahili diet was studied in order to attempt establish the origin, changes and adaptation of the Swahili culture.

Evolutionism is one of the earliest dominant theories generally in all social sciences. Charles Darwin (Berry, 1976) was the main exponent of the theory. Evolutionists believed that social change was subject to the natural evolutionary processes from simple forms to complex systems. The approach was later taken up by many anthropologists, e.g., Penniman, Edward Tylor, Morgan (see Berry, 1976). However, it was difficult to employ this theory in the present study because I was dealing with a much later period than the age of development to which Darwin theorized. Also, it is difficult to evaluate the work of the earliest anthropological thinkers without succumbing to the temptation of easy criticism.

The Neo-evolutionists, like evolutionists (Berry 1976), believed that the evolution of cultures followed determinable regularities. They argued that human beings are conservative by nature and they try as much as possible to preserve their lifestyle and can only change when forced by external factors beyond their control, thus there is no room for human creativity. Two exponents of the neo-evolutionary theory are Leslie White and Jullian Steward (1955). Judging neo-evolutionists by marxist stands the neo-
evolutionary approaches are examples of vulgar materialism because they view human behaviours as shaped more or less exclusively by non-human constraints.

The traditional normative approach emphasized cultural norms and mental templates. It was concerned with the examination of the cultural codes held in common by members of the society regardless of the setting they find themselves in (Willey & Sabloff, 1974) and thus has contrasting limitations. The culture-historical, evolutionary and neo-evolutionary approaches could not be applied in the present study as they appeared to be out-dated.

By 1960's the "New or processual archaeology" came into existence spearheaded by Lewis Binford (1965). They championed the positivist view of cultures. Positivists do not study phenomenon to discover inherent or primary meanings in them. Rather they argue that any phenomenon is assigned meaning by the human mind, and there may be as many different meanings as the investigator chooses to (Clarke, 1972: 253). The positivists argue that there are covering laws which can help to predict or explain cultures. But the application of general rules to explain cultures tends to ignore the diversities in human behaviour and environmental conditions which all influence human habits. Systems theory is part of new archaeology or processual archaeology and has been used to analyze archaeological artifacts. The theory emphasizes on "wholeness" of cultures and examines the interrelationships between different subsystems. The essence of the theory is that the behaviour of one subsystem can be understood and predicted from its functional links to others. But the theory reduces the individual to a passive and mechanical device who acts only according to the structural rules of the wider society.
that he is attached to. Like other theories discussed, the present researcher felt systems theory may not be helpful in analyzing the food culture of the Swahili because the Swahili dietary habits cannot be fully understood in a trajectory of growth of successive or progressive line as the system theorists see it, but in a manenvironment-relationship perspective.

In this research I, therefore, adopt the 'Ecological Model'. Ecology has been defined as the science of the interaction between living organisms and biotic environment. It emphasizes interspecies as well as intraspecies reaction. The model examines ecosystems and emphasizes the adaptation of living things to their environment and the mutual relations that occur in the course of that adaptation. The model focusses on mankind as the actor of the physical, biological and social environment which he has to tame for his survival (Ogot, 1975:11; Odegi-Awuondo, 1990).

Elements of ecology are the major inputs of the physical-environmental characteristics of the setting and certain properties of the human organisms which make up the populations of the setting. Other basic elements of the ecological model are economic possibilities of the setting (including the mode of economic exploitation and the likelihood of food accumulation). These also include demographic distribution of the population concentration. Physical-environmental factors provide a clear set of economic possibilities which human organisms, in attempting to meet their primary needs, can pursue (Berry, 1976).
Earlier, this approach had been used by ethnographers and geographers who considered the role of ecology in the development of cultural variation (Berry, 1976: 9-21). Forde (1934) tried to use the ecological approach in an anthropological analysis of cultural traits within a broad category, to demonstrate that there were "complex relations between the human habitat and the manifold technical and social devices developed for its exploitation" (ibid, 460). Others who have recently used the approach within the East African context are Odegi-Awuondo (1990) and Ominde (1975) in an attempt to understand man-ecology relationship. Indeed, it is right as the economic historian, Helge Kjekshus, has observed, "the East African economies developed within an ecological control situation where there existed a relatively stable balance between mankind and nature" (Quoted in Odegi-Awuondo, 1990:11).

There exist many aspects of society and culture which are not discussed here as the main objective is to analyze diet. But it is noteworthy to point out that within the ecological model there are sociocultural factors which influence or are associated with the socialization of a group, e.g., experience, upbringing, personalities, immediate desire, taboos, beliefs etc. all influencing behaviours (Berry, 1976). The Swahili dietary practices, like any other world people, is dependent upon a body of beliefs, taboos, as well as upon its history, its skills and its resources. The natural environment and the belief system of the Swahili are assumed to be the primary determinants of their adaptations.

The north Kenyan Swahili coast lies at the junction of diverse ecological and economic as well as cultural zones; it lies between the lowland wet forest and the dry
savana and surrounded by diverse cultural interactions-agrarian populations, pastoralists, fishermen and traders. Thus, the examination of the interaction and interrelationship between the Swahili and their environment, and the cultural groups they came into contact with helped to determine the kind of foods the Swahili bought and sold to these people. It also determined how this mutual co-operation eventually influenced some of the Swahili food practices. Already more recent studies along the coast offer supportive evidence of reciprocity and symbiotic relations between the coast and the interior (Abungu, 1989; Abungu and Mutoro, 1993).

In summary, therefore, the ecological model places the Swahili within their natural African setting where their diet was to a great extent influenced by the ecological setting they found themselves in, but the Swahili played a significant role in molding and controlling their environment. The Swahili dietary behaviour then is seen as a result of adaptation to the physical environment, the sociocultural environment and the economic environment they found themselves in.

2.4. Research Premises/Hypotheses

This research was based on the following premises:

1. The Swahili depended most on home produced/autochthonous foods.

2. The environment to a large extent influenced Swahili subsistence strategies.

3. That, the Swahili people were erstwhile traders who exchanged their local food products with their neighbours.
CHAPTER THREE

3.0. METHODOLOGY

3.1. Introduction

This chapter focuses on the research methodology used in the study. The chapter starts off by describing the research area - situating the two archaeological sites in the general environmental context of the north Kenyan Swahili coast. The chapter discusses the geological and ecological backgrounds of the area as well as its potential and thus attempt to justify the role of ecology in understanding the evolution and development of the Swahili diets. As is the case with all other parts of the continent knowledge of geological history or palaeoenvironmental changes of the post-Pleistocene is of great relevance to the understanding of cultural changes at the coast. East Africa was, in general, one of the areas which was greatly affected by changes in climate during the Pleistocene (Butzer 1971, 1982; Bishop et al, 1978; Onyango-Abuje and Wandibba, 1979; Leakey and Ogot, 1980).

3.2. Geological Background of the Northern Swahili Coast

Geological and landforms are the media through which climate operates. Almost the entire north Kenyan Swahili coast is covered by Quaternary and Holocene deposits which are composed of estuarine, sand, clays and coral limestone. It has also been speculated, though needs further geological work, that some Miocene deposits underlie the Quaternary deposits to the northeast of the region. The region can be divided into
eight different Quaternary and Holocene deposits: The first, sand dunes which are categorized into two and determined by age parameter. Here we have the Mundane range sand dunes and the Coastal sand dunes. The Mundane range are made up of former Pleistocene sands which due to ferric oxide staining have turned reddish in colour and rise upto 75m above sea level whilst the Coastal sand dunes are made up of mainly yellow or off-white sand and are only upto 35m above sea level. In areas where there has been no vegetation cover the dunes have been disturbed. In general, the dunes are thought to be younger than the Holocene period.

Second, the undifferentiated Quaternary sands consist of Pleistocene and Pliocene sands which cannot easily be distinguished from one another, they are both of lagoonal origin and are lithogically very similar. The sands are greyish or yellowish in colour and poorly cemented. They were probably deposited in low energy lagoonal conditions behind dune fields or barrier islands (Jaetzold, 1981). At the surface clay pans occur along the flood plains and their local relief hardly goes beyond 10m above sea level. Third, the near surface coral limestone underlies the surface/Quaternary deposits in over much of the area. It consists of raised coral reef of a maximum thickness of 100m above sea level but are more commonly between 30-50m thick. The coral beds form ridges which dictate the southwest flow of creeks like the Dondori, Mangoni and Wange. It is believed the reef was formed during the middle pleistocene (see Table I).

Fourth, Beach deposits which overlie either the Quaternary sands or coral. They were made up of clays, sands and coral breccia. Some are loosely cemented while others are not. But in general, they are characterized by low ridges which often control
the local drainage pattern. Fifth, the alluvial deposits found on top of the estuarine deposits and consist mainly of fine grained clayey to sand deposits. These are common around the Dondori creek, and the water underneath may be saline. Sixth, contemporary estuarine deposits are clayey sand deposits similar in composition to the Quaternary sands. They were formed as a result of recent erosional and depositional activities and are characterized by brackish swamp ideal for the growth of mangroves. Seventh, deltaic deposits are contemporary clayey deposits which occur along the Tana flood plain. Lastly, offshore coral and the barrier island complex is made up of the present beach deposits formed as a result of the lateral growth of coral breccia and sands.

The alluvium, vast sand dunes and cemented beach sands dominate the north Kenyan Swahili coasts' geological features which formed during the Holocene (Table 1). The geomorphological features along the coast including creeks and raised beaches were formed during the Quaternary as a result of fluctuations in sea levels (Ojany and Ogendo, 1973). For example, the present creeks in the region are actually drowned rivers. The fall in sea level enabled rivers to cut deep channels which reached their maximum extent in the then sea level (Kusimba, 1993). During the Holocene when the sea level rose, the older river courses were drowned to form the present creeks such as Dondori, Wange, and Mongoni. Abandoned cliff-lines, stacks, raised platforms, and raised beaches indicate that sea levels were higher in the past (Ojany and Ogendo, 1973; Table 1).
Table 1: Provisional Geological Sequence of the North Kenyan Swahili Coast

<table>
<thead>
<tr>
<th>Geological time Scale</th>
<th>Sea Level Changes at the Coast</th>
<th>Major Palaeogeographical Events at the Coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holocene (1/40 MYA)</td>
<td>Ride and aggradation to the present sea level.</td>
<td>Contemporary estuarine sedimentation. Formation of coastal dunes. Silting of creeks, fluvial sorting of pleistocene sediments to form clay filled depressions. Tana Delta deposition, coral reef formation.</td>
</tr>
<tr>
<td>Upper Pleistocene</td>
<td>4.6M</td>
<td>Further erosion of channels flooded to produce creeks in Holocene. Marine planation of earlier deposits.</td>
</tr>
<tr>
<td></td>
<td>9.1 M</td>
<td>Formation of Palaeo-beach ridges, dunes and coral formed upto 60km probable from current coast. Tana river deposition.</td>
</tr>
<tr>
<td>Middle Pleistocene</td>
<td>45.7M</td>
<td>Main erosion of deep channels which now form principal creeks and inlets. Coral reefs grow, plus deposition of “Quaternary sands and clay”.</td>
</tr>
<tr>
<td></td>
<td>30.5M</td>
<td></td>
</tr>
<tr>
<td>Lower Pleistocene</td>
<td>61M</td>
<td>Very low sea level erosion of marine platform on which coral reefs grows. Deposition of 'Quaternary sands and clays'.</td>
</tr>
<tr>
<td></td>
<td>61M</td>
<td></td>
</tr>
<tr>
<td>Pliocene (1.9-6.0MYA)</td>
<td>91.4m</td>
<td>Deposition of marine sands and clay</td>
</tr>
</tbody>
</table>

Source: Based partly on Caswell (1956), Matheson (1963), Ojany and Ogendo (1973) and the Lamu District Planning study Volume 1. Natural Resources Inventory. Prepared by Environment and Resources Consultancy, Clyde Surveys Limited Maidenhead, England (n.d).
3.3. Ecological Background of the North Kenyan Swahili Coast

The lithology and distribution of Quaternary sediments along the north Kenyan Swahili coast enables the understanding of the palaeogeography of the area and how it has influenced its ecology and human survival. The area is ecologically diverse, offering a wide range of basic resources that have attracted different cultural groups and productive modes. I have divided the region into major ecological land units, in which the major combinations of climate, soil and topography are isolated and equated with their basic vegetation types to indicate its ecological or land potential. There are three main rangeland units; viz, semi-arid savanna, lowland moist savanna and evergreen thicket onto which has been superimposed six eco-climatic types.

The lowland moist evergreen forest and derived savanna is found in the areas around Witu and much of Lamu District. The vegetation and land unit consist of forest and derived bushlands and grasslands and the potential is for forestry or intensive agriculture. Grazing can also be carried out in dry season on the seasonally flooded grasslands. However, grazing next to the forest and thicket bush could have been in the past restricted by wild animals and tse-tse fly (Ylavisaker, 1982). But veterinary services have allowed the keeping of mostly goats for milk and meat production in the settlements around and within the region.

In much of the coastal strip and offshore islands there are lowland evergreen thickets. It is an area of agricultural potential, one only needed to clear the bush and the thicket around. It could have also been possible to keep small livestock like goats and
sheep in this zone (but this requires further research). The lowland moist savanna supports a variable vegetation cover of moist woodland, dense bush and savanna near its coastal limits becoming increasingly drier inland. The area was in the past put under shifting cultivation and the practice continues to date. But generally a high agricultural potential is eminent depending on the soil type and availability of water.

The west and north of Lamu District has a marginal agricultural potential supporting a natural vegetation of dry forms of woodland and savanna. This area has been extensively cleared by burning giving way to fairly good grazing pastures. The woody shrubs dominating the vegetation can be utilized by both wildlife and domestic stock.

The coral reefs and littorals bear rich fishing grounds. Inland from the reefs, the island savanna has poor soils but there is adequate fresh water supply from the sand dune formations close to the sea-shore. The coastal strip contains mangroves which besides being an important source of timber provide excellent fish breeding grounds (Kusimba, 1993). The lowland wet forest along the coastal strip supports large animals, including elephants and rhinoceros. In addition, the soils in this strip are well watered and fertile (Ylavisaker, 1982). The riverine woodlands south of the Lamu archipelago in the Tana River area have green, well-watered forests and fertile soils (Miller, 1989, Winter, 1989).

In general, the north Kenyan Swahili Coast appears not to provide a particularly good basis for livestock development. The many constraints include, insufficient water supplies in the dry season, prevalence of tse-tse fly and abundance of dense bush thickets
and woodland in contrast to extensive grasslands or parklands. Therefore, it is possible that the people who inhabited this area could have harvested livestock in the overstocked hinterland. Poultry keeping was popular in the area and appeared to be good supplement for the people's diet. It is unclear whether the poultry was kept for cash income or for food.

A wide variety of crops can potentially be grown in this area. These include maize, sorghum, finger and bulrush millet, dolichos beans, green grams, cow peas, sweet potatoes, sunflower, sesame, soya beans, groundnuts, cotton, tomatoes, eggplants, kales, Chinese cabbage, chillies, sweet pepper, pumpkins, onions, water melons, cucumbers; pigeon peas and rice in the areas of intermittent lakes.

Crops that can be grown throughout the year round include mangoes, cashewnuts, pawpaws, west Indian avocados, cassava, guavas, senna and castor, coconuts, citrus fruits, pineapple and bananas. Much of the area suffers from flooding, therefore, crops like rice which can be grown in submerged clayey soils can benefit from the flooding. Sorghum, sweet potatoes and chick peas are reasonably tolerant to short term flooding and hence could be planted in places with less risk of flooding.

3.4. Research Methodology

Many different types of data and methods of data collection were employed in this study. There was room for contribution from the humanities, the social sciences, and natural sciences.
3.4.1 Data Collection

Library research offered secondary documentary sources which included both published and unpublished materials with a bearing on the study. They included books, theses, journals, and conference papers. These sources provided foundation on which the research developed. The information collected centred on the following aspects: historical, geographical, ecological, geological and description of early coastal foods. Because secondary sources have undergone interpretation, this research did not fully rely on them as the undisputed source of information. Thus, the study also made use of primary sources, e.g., archaeological materials, and oral traditions.

3.4.2 Archaeological Materials (Museum collections)

Archaeological evidence, for example, faunal and floral remains as well as other food-related artifacts was the main and primary source of information in this study. They provided information about the types of foods eaten and the general food practices, the quantity of foods and the environmental setting of the sites in question. Archaeological materials are taken to be more objective because the remains were available and were physically tested. The materials analyzed were those excavated by George Abungu at Ungwana in 1987-1988 and Shanga materials excavated by Mark Horton in 1980-1984. These materials are kept in Fort Jesus museum and Lamu museum, respectively.
3.4.3. Faunal Analysis

The faunal remains from Ungwana were analysed with the assistance of Mr. John Kimengich of the National Museums of Kenya while I re-examined the faunal remains from Shanga, Mark Horton and Nina Mudida, (1993) had earlier examined part of these remains.

It was difficult to analyse all the trenches at Ungwana and Shanga due to the abundance of the materials retrieved from them and due to time and financial constraints. Sampling was, therefore, done on the basis of trenches which offered information across the sites through time and space. The parts selected (i.e., the judgement sample) were determined by the need for particular evidence for specific questions, and this gave an estimate of how closely the analyses and observations obtained from the part examined represent the characteristics of the whole group.

At Ungwana, Trench 3 and Trench 4 were chosen for the purpose of analysis. These two trenches yielded large midden deposits, probably used for dumping rubbish. Trench 3 was very important because it produced the best stratigraphy and it was dug 3.9m deep before sterile sand was reached. It was rich in both local and imported pottery as well as faunal remains. Trench 4 was not only the largest trench, but yielded a lot of materials. It had a stratigraphy which was almost horizontal. This trench showed the way in which refuse was treated by the inhabitants of Ungwana; it was collected and disposed of outside the town and then burnt. This trench was therefore important because the Swahili diet was studied through the refuse/remains left behind.
At Shanga, Trench 1 and Trench 2 were chosen as samples. Trench 1 was located across the central enclosure and it was the most extensively worked trench - it was divided into seven periods of twenty-seven phases. Trench 2 was located just outside the central area. The levels through its sequence were largely domestic (unlike the other trenches, which were associated with industrial and religious activities).

Having decided on the working groups and the parameters to be studied and recorded, the bones were first cleaned (to remove dust). The faunal assemblages were initially sorted into bones and teeth, then into identifiable and non-identifiable specimens. The identifiable and non-identifiable specimens were further sorted out into elements/body parts. Finally, the identifiable ones were identified to species and recorded in terms of skeletal parts, for example, distal humeri. The identifiable bones gave information about the taxa, elements represented in the assemblage, statistical figure as regards population represented in the assemblage. The non-identifiable bones offered information on butchery practices, cooking and so on - some of the scrap bones of non-identifiable specimen had cutmarks.

The most crucial decision which a faunal analyst must make as regards the statistical manipulation of his data concerns the proper unit to use in that manipulation. Minimum number of Individual (MNI) was therefore worked out. It was worked out using dentition and this was cross-checked with the figures obtained from the long bones (tibia, humeri, and femur) and it was established that the figures did not contrast much. But for the birds, strictly long bones were used to work out the minimum number of individuals represented in the assemblage. The Fish bones were not identified to species.
because of lack of comparative analysis materials at Fort Jesus and Lamu museum laboratories, and time and financial constraints did not allow for the collections to be transported to Nairobi for analysis. Nonetheless, the fish bones were quantified in terms of weight and trends in relation to their use at Ungwana, recorded and discussed.

At that stage, with the bones identified, possible animal ages was investigated and recorded. This was not an easy task as it has always been. However, the writer used fusion of the epiphyses of the long bones, eruption and wear of the animal teeth (Chaplin, 1971). No attempt was made to determine the animal sex from the bones.

In any faunal analysis to study past dietary behaviour, particular features such as pathological lesions, butchery marks, signs of cooking should be noted, hence the bones of both terrestrial and marine animals were undertaken in this line. Evidence of diet from the cutmarks was reconstructed from the fracture patterns of the bones and bone fragments represented in the assemblage. Such modification patterns (e.g., in the form of gnawmarks, cutmarks, carnivore marks etc) were used to make comments on death, butchery and culinary population of the animals so as to establish if the animals were exploited for food (cultural accumulation) or whether the faunal assemblage was as a result of natural accumulation (Klein and Cruz-Uribe, 1984). Cutmarks made by man before or during eating are different from carnivore or rodent gnaw marks. Carnivore gnaw marks are of depressed structures or have nimble edges on protruding bone regions because carnivores often start chewing bones from the articular ends which are spongy (Mutoro, 1987:249).
3.4.4. Palaeo-botanical Analysis

It was hoped that floral evidence in the form of carbonized or unburnt seeds normally found in cooking pots, midden deposits and sometimes among ashes of hearths would be available. So far, no plant remains have been recovered from Ungwana and Shanga. The absence of direct evidence for crop cultivation does not necessarily mean that the early communities at Ungwana and Shanga were merely fishermen, livestock keepers and hunter-gatherers.

Crop/plant remains decay fast in humid conditions as might be the case with the coastal regions. They only preserve better if they become carbonized or preserved under very wet or dry conditions. However, there is considerable indirect evidence to suggest that the inhabitants of Ungwana and Shanga actually practised food crop cultivation and used food crops in their diet. The grindstones recovered at Ungwana may suggest among other things grain presence and the making of flour. The metal axe was probably used in bush clearing for cultivation. In agriculture, the Swahili prefer an axe more than a panga. They mostly practise shifting cultivation hence an axe is greatly needed to clear the bush. These artifacts and many others of ceramic type constitute indirect yet convincing evidence that crop cultivation and use of food crops was a probable undertaking of the Ungwana and Shanga inhabitants. Ethnographic observations by the writer in the course of the research lend supportive evidence of food crop cultivation. For instance, at Kipini there are banana and mango farms while at Lamu there are coconut farms.
3.5. Conclusion

This chapter has shown the geological areas which comprise diverse ecological zones that have offered a variety of survival opportunities. The coastal plain and islands offered marine resources and access to trade routes. The bushland and forested areas was suitable to wild animals including elephants, rhinos, leopards, lions among others that provided items that were important trade goods in the long distance maritime trade in which the Swahili have taken part since the first century A.D. The rich mangroves besides providing timber were suitable fish spawning localities. Thus, the Swahili coasts' attractiveness to human settlement made the coast an inevitable area for competition for settlement and exploitation of local resources. Arable land was scarce, but this did not hinder farming and agriculture in the patches that were arable.

Archaeology when investigating past diet seeks to understand animals and plants of an area. Regrettably, no direct floral evidence was found from the sites studied. Such a failure was very unfortunate for until this wider spectrum of information is available from the coastal sites, no comprehensive palaeoenvironmental picture can usefully be written. On the other hand, throughout the period under investigation the ecology of the game species was increasingly dictated by man. For this reason I did not believe that we could apply the ecological requirements of present populations to those of the past with sufficient precision by using game mammals as a primary source of environmental data. This restriction was a matter of precision rather than total inadequacy. Modern populations still have their ecological needs, optimum habitats and
limitations which can be investigated. In some cases these will probably be comparable to some of those ancient populations which can be identified to species.

Ecological interpretation of any deposit is complex. The character and content of the site deposits is unlikely to be representative of the species present, their abundance or distribution in the area nor always of the species and numbers obtained. The situation becomes even more complex when doing sampling. Thus, on "prehistoric" habitation site the proportional representation of species is not suitable for determining the ecology of the home range. This can only be assessed according to the presence or absence of species when absence is not due to cultural artefact and occurrence is not anomalous.
4.0. DATA ANALYSIS

4.1. Introduction

Abungu's Ungwana archaeological excavations of 1987-88 and Mark Horton's excavations at Shanga of 1980-84 are the subject of this chapter. The data from the two sites are divided into direct evidence and indirect evidence and are examined at the same time. Direct evidence here focusses on faunal remains while Indirect evidence refers to ceramic and non-ceramic finds. Ungwana was first excavated by James Kirkman in 1953-55 and the findings were published in 1966. Wilson (1978) opened up a sondage near the domed tomb, and in 1987-88, George Abungu excavated the site (Abungu, 1989).

The Ungwana ruins lie on the Tana Delta about 2 km east of the modern town of Kipini. Ungwana is believed to have had connections with both Shaka and Mwana, which are other Swahili settlements on the Tana Delta. This connection can be extended to other Swahili settlements on north Kenyan Swahili coast as well as interior of the coast like Wenje, Goloyo and Lake Bilisia. Ungwana flourished from the 10th century to the 17th century A.D. when it was abandoned.

The settlement has a surrounding environment which includes the fertile river banks, the ocean, the fertile fishing grounds of coral rock outcrops and a wide range of vegetation from true forest to grassland with a variety of wildlife. The Tana Delta possesses rich soils (from the annual flooding and deposition of silt/alluvium along the flood plain) and receives adequate annual rainfall. The availability of rich soils and
water probably allowed farming to go on all the year round; this may have yielded dependable supply of food. River Tana and the ox-bow lakes around provided fresh water-fish and drinking water. Drinking water may have also been obtained from numerous wells which have been found at Ungwana. Up to the present, the Ungwana surrounding obtains fresh water from the boreholes dug a few metres below the ground.

River Tana, particularly in its lower part, is presently used for transporting both people and goods using dug-out canoes. It is probable that the lower Tana was used as a means of trade route in the past. The River banks are today used for growing mangoes and bananas, while the swamps are under rice cultivation through the initiative of the Tana and Athi River Development Authority (TARDA).

Shanga on the other hand is located on the southern part of Pate island, on a coral Peninsula; at longitude 41.04°E and latitude 2.08°S. The settlement flourished from the 8th century A.D. to the 15th century A.D.

The site was first noted by Stigand in 1913 and later by Kirkman (1957a) and surveyed by Chittick in 1967. Further investigations were done by Wilson in 1978. Mark Horton excavated the site in 1980-84 (Horton, 1984).

Shanga is located in a productive environment. It has a well-stocked reef providing fish, turtle and sea mammals and has a relatively fertile and well-watered mainland suitable for agriculture. In the earlier periods, the mainland and island may have had a lot of wild animals which were hunted for food and may be for trade. The island itself is generally poor agriculturally. Crops grown on the island today include
coconut and cashewnut together with cattle and goats which roam the island during the day and penned in at night.

4.2. Direct Evidence

The Ungwana and Shanga excavations yielded large quantities of faunal remains. They were analysed with the help of John Kimengich, a National Museums of Kenya staff based at Mombasa. Detailed discussion of the analytical methodology has been given in chapter 3.

The results from the analysis show that the inhabitants of Ungwana and Shanga relied mostly on domestic animals (cattle, goats, sheep and poultry) as their main or preferred source of protein. Wild animals (cape buffalo, bush buck, steenbok, bush duiker, dik-dik, oribi etc.) were also identified. Fish bones were numerous at Ungwana but were not studied in detail due to lack of comparative collection at both Mombasa and Lamu museums. There are comparative fish bones in Nairobi but due to time and financial constraints, it was difficult to transport the materials to Nairobi for analysis. However, the bones belonging to fish were present right from the inception of the settlement till its decline. It was evident that there were numerous fish species represented in the collection. We were only able to positively identify the cat-fish.

A considerable quantity of the bones studied at Ungwana and Shanga were burnt to varying degrees, and were uniformly distributed throughout the layers in the trenches studied (i.e. Trenches 3 and 4 at Ungwana and Trenches 1 and 2 at Shanga).

The Ungwana analysis revealed that terrestrial animals were consumed in greater quantity than marine resources. Table 2 shows that out of the 613 bones and bone fragments studied, the largest quantity of these belonged to Birds/chicken?. There were
287 bones of this type, accounting for 46.8% of the total bones studied (Tbs). Cattle were represented by 126 bones, accounting for 20.6% of the Tbs. The birds/chicken bones were well represented throughout the settlement periods. This may tend to suggest that a majority of the birds were domesticated, for example, chicken, duck, goose and turkey. These kinds of poultry are common around the settlement today. There is, however, a possibility that some of the birds (although they may have been fewer in number) belonged to the wild bird species, for instance, wild sea birds, guinea fowl and so on. These wild bird species were perhaps used to supplement the domestic birds' supply of protein.

Table 2: Total bones per Taxon in Trenches 3 and 4 at Ungwana

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Total bone</th>
<th>% of total bone studied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bos taurus</td>
<td>126</td>
<td>20.6</td>
</tr>
<tr>
<td>Ovicaprids</td>
<td>97</td>
<td>15.8</td>
</tr>
<tr>
<td>Wild animal</td>
<td>40</td>
<td>6.5</td>
</tr>
<tr>
<td>Camel</td>
<td>6</td>
<td>1.0</td>
</tr>
<tr>
<td>Crocodile</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Suidae</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Carnivora</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>Porcupine</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Cat (Felis sp.)</td>
<td>16</td>
<td>2.6</td>
</tr>
<tr>
<td>Giant Rat</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Snake</td>
<td>6</td>
<td>1.0</td>
</tr>
<tr>
<td>M. Lizard</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Dugong</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Turtle</td>
<td>10</td>
<td>1.6</td>
</tr>
<tr>
<td>Aves</td>
<td>287</td>
<td>46.8</td>
</tr>
<tr>
<td>Rodentia</td>
<td>9</td>
<td>1.5</td>
</tr>
<tr>
<td>Human</td>
<td>4</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>613</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Other domesticated animal species represented included sheep/goats. The sheep/goats total bones were third greatest in quantity. They were 97 in number, accounting for 15.8% of the Tbs. The bones belonging to the wild animal species were 40 in number, accounting for 6.5% of the Tbs. For marine species, there were dugongs (3 in number), accounting for only 0.5% and 10 turtle bones accounting for 1.6%. Also represented in the bone assemblage were 6 camel bones accounting for 1.0% of the Tbs, 1 crocodile bone, wild pig, porcupine, giant rat, each accounting for 0.2% of the Tbs. 2 carnivore bones accounting for 0.3% of the Tbs. There were 3 bones belonging to the monitor lizard, this accounted for 0.5%. Snake and cat (felis Sp.) bones were 6 and 16 in number, accounting for 1.0% and 2.6% respectively. There were 9 rodent bones, accounting for 1.5%; and 4 human bones, accounting for 0.7%.

In total, the number of bones belonging to the domesticated animals (cattle and sheep/goats) were 223, accounting for 36.4% of the Tbs. The wild animal bones were only 40 in number, accounting for 6.5%. These figures suggest that the inhabitants of Ungwana obtained a greater quantity of protein from domestic animals than was the case from wild animals. Snakes, cats, carnivores and rodents were probably not eaten.

At Shanga the largest quantity of the bones belonged to fish (Table 3). They were 865 in number, accounting for 36.3% out of the total of 2,385 bones studied. Many fish species were represented most of which are still being fished in the Lamu archipelago waters up to the present day. Cattle bones were 431, accounting for 18.1% of the Tbs. Sheep/goats bones were 428, accounting for 17.9%. Wild animals (dik-dik, Suni, duiker, bush buck) bones were only 113, accounting for 4.7%. In all, domestic
animals (cattle and sheep/goats) bones pieces were 859 in total, accounting for 36% of the Tbs. These statistics, like at Ungwana, suggest that the bulk of the meat supply was obtained from domestic animals. Wild game meat, however, was a fair supplement to the domestic animal products (milk, meat and ghee). As indicated in chapter 3, the mainland opposite the Lamu archipelago was (and still is) forested therefore, suitable for hunting wild animals. The smaller wild animals (ungulates), for example, the dik-dik were probably hunted on the island as well. The dik-dik are still found on the island to the present day.

Bones belonging to bird/chicken? were also represented in the faunal assemblage. Birds bones were 362 in number, accounting for 15.2% of the Tbs. Birds were distributed throughout the periods of occupation at Shanga. One may then argue that most of the birds, like at Ungwana, belonged to the domesticated species. For example, chicken, turkey, goose, duck and other types of poultry were identified. There were of course some few birds bones which belonged to the wild species. Some of these may have been eaten while others were not.
Table 3: Total Bones per Taxon in Trenches 1 and 2 at Shanga

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Total Bone</th>
<th>% of bone</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>865</td>
<td>36.3</td>
<td></td>
</tr>
<tr>
<td>Bos taurus</td>
<td>431</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>Ovicaprids</td>
<td>428</td>
<td>17.9</td>
<td></td>
</tr>
<tr>
<td>Aves</td>
<td>362</td>
<td>15.2</td>
<td></td>
</tr>
<tr>
<td>Turtle</td>
<td>128</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Wild animal</td>
<td>113</td>
<td>4.7</td>
<td></td>
</tr>
<tr>
<td>Dugong</td>
<td>34</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Camel</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Rat</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Jackal</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cat</td>
<td>24</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Snake</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Frog</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Lizard</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2385</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

Turtle bones were 128, accounting for 5.4% of the Tbs. Dugong were 34 in number, accounting for 1.4%. Dugong was an infrequent protein supplement to fish, cattle and sheep/goats. Dugong has delicious meat and fat and its fishing still continues in the Lamu archipelago to the present day by the Bajuni and it is likely that the same people may have supplied Shanga inhabitants with dugong (Elliot, 1925/26; Grottanelli, 1955a; Freeman-Grenville, 1966; Horton, 1984).

Monitor lizard, frog and snake bone remains were also represented at Shanga. There were no signs that frog and snake were eaten. Monitor lizards may have been eaten and they appear to have been marginal or simple foods. Al-Idrisi (Lewis, 1974) noted the eating of frog, snake and monitor lizards at Budhuna (whose location and modern name is still unknown). Presently, the people on Pate island eat monitor lizards and another type of lizard known as "yuru". It is therefore possible that the monitor lizards were also consumed by the inhabitants of Shanga.
lizards and the "yuru" were eaten by the inhabitants of Shanga if ethnographic observations are anything to go by.

Also represented among the faunal assemblage at Shanga are cat, dog, jackal and camel. The cat is a common animal in the Swahili house. Cats may have been kept as pets or to check the menace of rodents such as rats which have been positively identified at Shanga. The dog was probably used for hunting as well as for protection. One of the camel bones had butchery cut marks that would suggest that they were probably eaten. The eating of camel meat is popular among the Swahili people along the Kenyan Coast. Unlike at Ungwana, pig bones were not found at Shanga.

A summary of the quantity of protein use at Shanga reveals that fish was the main source of protein during the earliest period of occupation (ca. 800-900 A.D.) (Table 4 and 5). 200 fish bone remains were recorded accounting for 85.8% of the total bone remains. During the early period, the only protein supplement to fish was birds. 33 bone remains of this type were recorded accounting for 14.2% of the total bone remains from this period.
Table 4: Total bone Count per Period in Trench 1 and Trench 2 at Shanga

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Period. 2</th>
<th>Period. 3</th>
<th>Period. 3</th>
<th>Period. 4</th>
<th>Period. 5</th>
<th>Period. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>200</td>
<td>196</td>
<td>146</td>
<td>148</td>
<td>135</td>
<td>40</td>
</tr>
<tr>
<td>Bos taurus</td>
<td>0</td>
<td>36</td>
<td>71</td>
<td>108</td>
<td>132</td>
<td>84</td>
</tr>
<tr>
<td>Ovicaprids</td>
<td>0</td>
<td>32</td>
<td>55</td>
<td>105</td>
<td>156</td>
<td>80</td>
</tr>
<tr>
<td>Aves</td>
<td>33</td>
<td>32</td>
<td>48</td>
<td>93</td>
<td>108</td>
<td>48</td>
</tr>
<tr>
<td>Turtle</td>
<td>0</td>
<td>12</td>
<td>10</td>
<td>33</td>
<td>53</td>
<td>20</td>
</tr>
<tr>
<td>Wild animal</td>
<td>0</td>
<td>12</td>
<td>8</td>
<td>33</td>
<td>44</td>
<td>16</td>
</tr>
<tr>
<td>Dugong</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Camel</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jackal</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>16</td>
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<tr>
<td>Cat</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Snake</td>
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<td>Frog</td>
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<td>0</td>
</tr>
<tr>
<td>Lizard</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>320</td>
<td>340</td>
<td>536</td>
<td>640</td>
<td>316</td>
</tr>
</tbody>
</table>

Table 5: Period by Period Percentage of the Total Bones Studied at Shanga

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Period. 1</th>
<th>Period. 2</th>
<th>Period. 3</th>
<th>Period. 4</th>
<th>Period. 5</th>
<th>Period. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>85.8</td>
<td>61.3</td>
<td>42.9</td>
<td>27.6</td>
<td>21.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Bos taurus</td>
<td>0</td>
<td>11.3</td>
<td>20.9</td>
<td>20.1</td>
<td>20.6</td>
<td>26.6</td>
</tr>
<tr>
<td>Ovicaprid</td>
<td>0</td>
<td>10.0</td>
<td>16.2</td>
<td>19.6</td>
<td>24.4</td>
<td>25.3</td>
</tr>
<tr>
<td>Aves</td>
<td>14.2</td>
<td>10.0</td>
<td>14.1</td>
<td>17.4</td>
<td>16.9</td>
<td>15.2</td>
</tr>
<tr>
<td>Turtle</td>
<td>0</td>
<td>3.75</td>
<td>2.9</td>
<td>6.2</td>
<td>8.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Wild animal</td>
<td>0</td>
<td>3.75</td>
<td>2.4</td>
<td>6.2</td>
<td>6.9</td>
<td>5.1</td>
</tr>
<tr>
<td>Dugong</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.0</td>
<td>0.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Camel</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jackal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cat</td>
<td>0</td>
<td>0</td>
<td>0.6</td>
<td>0</td>
<td>0.9</td>
<td>5.1</td>
</tr>
<tr>
<td>Snake</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Frog</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lizard</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
A summary of the quantity of protein in-take in the diet of the Ungwana inhabitants show that right from the inception of the settlement, that is, period I (ca. 950 - ca. 1150 A.D.), cattle, sheep/goats, birds and wild animals and probably monitor lizard offered the main and only source of protein (Table 6 and 7). Of these, sheep/goats was the greatest source, accounting for 36.4%. Cattle accounted for 27.3%, birds 18.2%, wild animals and monitor lizard each accounted for 9.1%. Domestic animals (cattle and sheep/goats) and birds protein supply during the earliest period of occupation appears to have been supplemented by wild animal meat.

During period II occupation at Shanga (ca. 900-1000 A.D.), fish was still the main source of protein despite reducing drastically to 61.3%. Birds consumption also fell down to 10%. Additional protein source supplements were taken in during period II phase; and, they continued to be consumed till the decline of the settlement. These included cattle accounting for 11.3%, sheep/goats 10%, wild animals and turtle each accounting for 3.75%. The reduction in fish and birds consumption may have been due to the introduction of the additional protein sources in the Shanga diet.

In period II at Ungwana (ca. 1150-1200 A.D.), the greatest source of protein was birds; Birds bones accounted for 42.9% while the proportion of Sheep/goats dropped to 24.5%. Cattle consumption drastically reduced from 27.3% in period I to 10.2% in period II. Wild animal consumption also reduced to 6.1% from 9.1%. The reduction in the consumption of sheep/goats, cattle and wild game meat may probably have been due to increased consumption of birds and other species; it is, for instance, during this
period that we had the first appearance of turtle and dugong in the Ungwana diet. The bones belonging to turtle and dugong each accounted for 2.0% of the TbS. The fact that

Table 6: Total bone count per period in Trench 3 and Trench 4 at Ungwana

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Period 1</th>
<th>Period 2</th>
<th>Period 3</th>
<th>Period 4</th>
<th>Period 5</th>
<th>Period 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bos taurus</td>
<td>3</td>
<td>5</td>
<td>84</td>
<td>20</td>
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<td>7</td>
</tr>
<tr>
<td>Ovicaprids</td>
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<td>12</td>
<td>57</td>
<td>17</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Wild animal</td>
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<td>3</td>
<td>29</td>
<td>3</td>
<td>2</td>
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<td>0</td>
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<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Carnivora</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Porcupine</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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<td>2</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Giant rat</td>
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<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Snake</td>
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<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M. lizard</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Dugong</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Turtle</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
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<td>Aves</td>
<td>2</td>
<td>21</td>
<td>190</td>
<td>45</td>
<td>23</td>
<td>6</td>
</tr>
<tr>
<td>Rodentia</td>
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<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Human</td>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taxon</th>
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<th>Period 2</th>
<th>Period 3</th>
<th>Period 4</th>
<th>Period 5</th>
<th>Period 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>49</td>
<td>390</td>
<td>97</td>
<td>40</td>
<td>26</td>
</tr>
</tbody>
</table>
Table 7: Period by period Percentage of Total Bones Studied at Ungwana

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Period. 1</th>
<th>Period. 2</th>
<th>Period. 3</th>
<th>Period. 4</th>
<th>Period. 5</th>
<th>Period. 6</th>
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<td>Bos taurus</td>
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<td>10.2</td>
<td>21.5</td>
<td>20.6</td>
<td>17.5</td>
<td>26.9</td>
</tr>
<tr>
<td>Ovicaprids</td>
<td>36.4</td>
<td>24.5</td>
<td>14.6</td>
<td>17.5</td>
<td>10.0</td>
<td>11.5</td>
</tr>
<tr>
<td>Wild animal</td>
<td>9.1</td>
<td>6.1</td>
<td>7.4</td>
<td>3.1</td>
<td>5.0</td>
<td>7.7</td>
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<td>0</td>
<td>1.0</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Crocodile</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0.3</td>
<td>0</td>
<td>2.5</td>
<td>0</td>
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<tr>
<td>Carnivora</td>
<td>0</td>
<td>0</td>
<td>0.3</td>
<td>1.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Porcupine</td>
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<td>0</td>
<td>0.3</td>
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<td>0</td>
</tr>
<tr>
<td>Cat (felis sp.)</td>
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<td>4.1</td>
<td>2.3</td>
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<td>0.3</td>
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<td>0</td>
</tr>
<tr>
<td>Snake</td>
<td>0</td>
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<td>1.0</td>
<td>1.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>M. lizard</td>
<td>9.1</td>
<td>0</td>
<td>0.3</td>
<td>0</td>
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<td>3.8</td>
</tr>
<tr>
<td>Dugong</td>
<td>0</td>
<td>2.0</td>
<td>0.3</td>
<td>0</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Turtle</td>
<td>0</td>
<td>2.0</td>
<td>1.0</td>
<td>2.1</td>
<td>2.5</td>
<td>7.7</td>
</tr>
<tr>
<td>Aves</td>
<td>18.2</td>
<td>42.9</td>
<td>48.7</td>
<td>46.4</td>
<td>57.5</td>
<td>23.1</td>
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<tr>
<td>Rodentia</td>
<td>0</td>
<td>4.1</td>
<td>0.3</td>
<td>2.1</td>
<td>0</td>
<td>15.4</td>
</tr>
<tr>
<td>Human</td>
<td>0</td>
<td>0</td>
<td>0.8</td>
<td>1.0</td>
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<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

only one type of each was represented at the site during this period, makes it difficult to make a firm generalization about them. Suffice it to say, the turtle and dugong species formed delicacies which were infrequent or rare foods. Other species represented during the period are snakes and crocodiles, accounting for 2.0% each. There were also rodents accounting for 4.1%. Snake and rodents are not eaten by the Swahili people and it is unlikely that the early inhabitants of Ungwana ever ate them. Crocodile on the other hand, appears in the settlement only during period II. Hence, a number of hypotheses were arrived at. First, its representation may have been stray occurrence. Second, it may probably confirm the presence of Pokomo or Pokomo influence at Ungwana as the
Pokomo are known to eat crocodiles. However, the first hypothesis seems more plausible since only one specimen was represented.

During period III occupation at Shanga (ca. 1000-1100 A.D.), there was increased consumption of cattle and sheep/goats. Cattle accounted for 20.9% and sheep/goats 16.2%. Birds consumption which had reduced during period II increased in period III. It accounted for 14.1%. The reducing trend in fish consumption which began during period II persisted in period III till the end of the occupation period. But, fish was still the unrivalled source of protein during period III accounting for 42.9%. Turtle and wild animals consumption slightly decreased to 2.9% and 2.4% respectively.

Around ca. 1200-1350 A.D. at Ungwana (period III), birds consumption experienced a steady increase and was still the most popular source of protein, they accounted for 48.7%. Cattle consumption also increased to 21.5% having fallen to 10.2% in period II. There was also increased consumption of wild game meat, whose bones accounted for 7.4%, while sheep/goats consumption continued to decrease accounting for only 14.6%. Dugong and turtle consumption also reduced to 0.3% and 1.0% respectively. Monitor lizard which was probably consumed in the earliest periods and is absent in period II, appeared again in period III where it accounts for 0.3%. The camel, porcupine, and giant rat appeared at Ungwana for the first time. Camel accounted for 1.0% while porcupine and giant rat each accounted for 0.3%. The latter two did not appear again till the decline of the settlement. Camel and porcupine were probably eaten by the inhabitants of Ungwana. Only one giant rat was found at Ungwana - again here it was difficult to make firm generalization about it. Like the crocodile
bones, the representation of giant rat at Ungwana may have been accidental or it may be attributed to the presence of the Mijikenda during this period. The Mijikenda eat the giant rat up to this day.

During period IV occupation at Shanga (ca. 1100-1200 A.D.), consumption of sheep/goats, birds, turtle and wild animals increased. Sheep/goats accounted for 19.6%, birds 17.4%, turtle and wild animals accounted for 6.2% each. Notable during this period was the drastic reduction in fish consumption but fish still remained the main source of protein. Fish accounted for 27.6%. There was also a slight decrease in cattle consumption, which accounted for 20.1% - being the second main protein source. For the first time in the history of Shanga occupation, dugong became an additional protein supplement. Dugong were represented by 3.0%.

During Period IV at Ungwana (ca. 1350-1450 A.D.), birds consumption decreased to 46.4% but still maintained the lead as the most popular source of protein. There was increased consumption of sheep/goats and decreased consumption of cattle. They accounted for 17.5% and 20.6% respectively. Wild game meat consumption drastically reduced to 3.1%, turtle consumption stood at 2.1%. There was no dugong consumed during this period. The quantity of camel bones doubled to 2.1%. The decrease in consumption of birds, cattle and wild animals may be attributed to increased consumption of sheep/goats or for some other factors.

Period V occupation at Shanga (ca. 1200-1300 A.D.) shows that sheep/goats was the most popular source of protein having overtaken fish whereby sheep/goats accounted for 24.4% and fish 21.1%. Cattle, turtle and wild animals consumption increased.
Cattle accounted for 20.6%, turtle 8.3% and wild animals 6.9%. There was a decrease in birds consumption; it reduced to 16.9%. Dugong consumption drastically reduced to 0.9%.

During period V occupation at Ungwana (ca. 1450-1500 A.D.) there was drastic fall in sheep/goats and cattle consumption. Sheep/goats accounted for 10% and cattle 17.5%. Birds consumption drastically increased to 57.5%. Wild animals consumption also increased to 5.0%. Dugong and turtle accounted for 2.5% each. The drastic decrease in domestic animals (cattle and sheep/goats) consumption may suggest that most of the domestic animals were mostly kept for milk and ghee and slaughtered only on special occasions, for example, birth of a child, and other ceremonies and festivals.

Some of the teeth of these domesticated animals showed signs of eruption. This implies that some of the cattle and sheep/goats were killed when very old. The bulk of the meat supply was provided by the birds, wild game, turtle and dugong. The representation of wild pig during this period at Ungwana was surprising, especially at a time when Islam had already taken root at the coast. Being Moslems, the Swahili community at Ungwana could not certainly have eaten the pig. Islamic culture prohibits ("Haram") the eating of pig because they consider the animal dirty. But, since only one pig was represented throughout the occupation period of the settlement, this makes the find a stray occurrence. The pig bone may have been brought around the settlement by carnivores (which have been positively identified at Ungwana). On the other hand (although this is a weak assumption), the presence of pig may help to confirm the presence of non-
muslim communities at Ungwana. Presently the area around Ungwana is inhabited by
the Swahili, Mijikenda, Pokomo and other hinterland communities.

The final period of occupation at Shanga (ca. 1300-1400 A.D.) witnessed a
dramatic change or shift in protein in-take. Fish became the fourth preferred source
accounting for 12.7%. During this period, cattle was the main source of protein,
accounting for 26.6%. Sheep/goats was the second in preference. It accounted for
25.3%. Birds supply reduced to 15.2% but for the first time offered greater protein
requirement than fish. Wild animals also reduced to 5.1% but dugong consumption
dramatically increased to 3.8%.

During the last period of occupation at Ungwana (ca. 1500-1600 A.D.), cattle
was the most preferred source of protein. Cattle overtook birds which throughout the
periods of occupation had been the most popular source of protein. Cattle drastically
increased to 26.9%. Birds drastically reduced to almost half of the previous period (i.e.
23.1%). Sheep/goats consumption increased to 11.5%. Wild animals and turtle
consumption also experienced an increase. They both accounted for 7.7% each.
Monitor lizard was also probably consumed in the last period of occupation. It accounted
for 3.8%. It was difficult to account for such reduction in birds consumption. But it
may be argued that it was due to increased preference for cattle, sheep/goats, wild animal
species and intensification of turtle fishing.

A faunal analysis to investigate diet is inadequate without explaining the butchery
practises, cooking and the eating habits of the people being studied. In this regard a
study of the faunal assemblage was undertaken to attempt to establish the Ungwana and
Shanga methods of slaughter, the process and preparation of food. How this can be done is discussed in chapter 3.

**Butchery Techniques**

A great quantity of bones from Ungwana and Shanga are long bone fragments of large and small animals. Some complete long bones of small animals like sheep/goats and even birds were also found. The broken bones had fractures which ranged from man-made cutmarks, carnivore marks to rodents gnaw marks. The cutmarks (chopping marks) appear to have been made using some sharp objects, probably iron knives and axes - these have been positively identified at the two sites. The iron knives and axes are discussed in detail under the indirect evidence in the succeeding sections. The knives were likely used to dismember the animal body parts into pieces which could be carried home and also accommodated into the cooking vessels. The long bones could have also been broken before cooking. It was also easier to extract marrow from the broken long bones.

Some bones belonging to the smaller animals (ungulates) like sheep/goats, dik-dik appear to have been broken twice or thrice unlike the long bones of larger animals which had to be broken into several pieces before they could be prepared to fit in the cooking pots. This assumption is based on the fact that most of the ungulate bones were not very fragmented. They were either in the form of full bones or proximal and distal ends. Chewing bones during eating could have also caused further breakage of the bones. But, some of the long bones belonging to the sheep/goats may have been connected with rituals. For example, in the Swahili culture, when a child is born a goat is slaughtered
and the animal bones are not broken. This is to protect the child from physical harm. The practice is called "Hakiki" and it is performed as "sadaka". Chicken was also another form of "Sadaka". It was used by the "mwali" or "mganga" (medicineman) to execute charm or medicine on people who sought their help. The iron knives were also probably used for skinning the animal and cutting meat into manageable small pieces.

Some of the bones, however, had gnaw marks and carnivore marks. These marks are different from those made by man in the course of food preparation and eating. Carnivore, cat and rodents have been represented in the faunal assemblage. The bones with carnivore marks were having depressed fractures or "nimbled" on the protruding bone regions. The carnivores are fond of starting to gnaw the bones from the articular ends which are soft or spongy (Gifford, 1977: 264; Mutoro, 1987: 249). Other bone fragments of the large animals showed bashing marks. This suggests that the fractures were made by hand-held iron or stone objects but certainly not sharp implements.

The wild animals were hunted using arrows. Arrow-heads were recovered from the Ungwana and Shanga excavations and are discussed in detail under the indirect evidence. At Ungwana large animals, for example, buffalo were probably killed outside the settlement and only parts which yield maximum meat (femur, humerus etc.) were carried home. The medium and the smaller animals like dik-dik, oribi, bush buck whose carcasses are not as heavy and bulky as the large animals were probably carried whole home. Most of the medium and small wild animals were in most cases
represented by nearly all body parts while the large ones were only in terms of long bones. Chickens and other wild birds were killed within the settlement - almost all the elements of birds were recovered from the excavations. Some chicken appear to have been killed when very young. But preference towards mature birds was noted.

No animal skull was recovered at Shanga, like at Ungwana the animals were probably butchered and slaughtered outside the settlement and only the body parts (e.g. femur, humeri etc.) which yield maximum meat were carried to the settlement. The remaining body parts were perhaps left or buried at the slaughter points after the little meat they contained was removed. It is also possible that some of the meat was prepared (roasted) at the slaughter points and consumed there or the heads may have been buried elsewhere even though slaughtering took place within the settlement.

Fish remains at Shanga appear to have been cut into smaller pieces before being cooked. The heads were chopped off - the larger fish had cut-marks on their cleithrum (the backbone that connects the head with the rest of body). The presence of cutmarks around the cranium of most of the large fish vertebrae also suggest that the large fish were broken into smaller pieces for easier cooking. Most of the fish skulls appeared almost intact, it was therefore not clear whether the heads of both small and large fish were cooked and eaten. If the heads of large fish were eaten then I expected them to have been broken into smaller pieces for easier cooking. But that was not the case.
The recovery of nearly complete body parts of the domesticated animals suggest that they were killed and slaughtered within the settlements or a way and the whole carcase carried home.

Cooking and Eating Habits

The cooking and eating habits of the Ungwana and Shanga inhabitants was shown from the bones studied. It was also inferred from the considerable number of pottery with signs of post-fire blackening and the grinding stones that were recovered from the site.

As mentioned before, a considerable quantity of the bones were burnt to varying degrees. The bones that were moderately burnt may attest to meat and fish roasting while those bones that were extensively burnt or charred may have been thrown into fire after meals to get rid of them. The burning of leftovers and/or rubbish is still a common practice around the areas today. Such leftovers may have been got rid of in this way so as not to attract nocturnal animals into the settlement or it was simply a common practise of maintaining cleanliness.

The presence of narrow-mouthed, several carinated and necked blackened pots in their exterior and the presence of long bones which may have been deliberately broken by man may suggest stewing of meat and fish. The long bones were probably broken into pieces which could be accommodated in the cooking pots for stewing purposes, or simply to have access to the marrow.
Ungwana and Shanga excavations yielded pottery of different sizes, shapes and functions. There were cooking vessels, serving vessels, drinking and storage vessels. There were also some small clay cooking pots ("kijungu") which may suggest child’s cooking pots or probably for medicine ("vyadawa"). The clay vessels in the form of bowls were probably food serving dishes for the members of the family. The smaller bowls may have been used for serving individual portions of the family or used for soup and sauce. The storage and drinking vessels were not placed on fire. Suffices to mention at this point that the cooking vessels had traces of soot blackening after the normal firing during pot manufacture.

Most of the birds long bone ends were missing. This may imply that the ends were chewed for their cartilage and epiphyses during meals. It is also possible that some of these soft ends were gnawed by rodents. The presence of several dumping grounds within the settlement may imply that the meals were eaten within the settlement and the leftovers thrown into fire or rubbish pits.

The practice of cutting animal bones and fish into smaller pieces, roasting and/or stewing appears to have been common at both Ungwana and Shanga. Fish was dried, salted or smoked before it was cooked or when fresh from the water - this is the practice today around the Lamu archipelago. But since the cranial items for terrestrial animals were lacking among the bones studied, it was difficult to know whether they were cooked (stewed for soup), roasted or thrown away.
4.3. **Indirect Evidence**

As mentioned in the introductory paragraph of this chapter Indirect evidence here refers to ceramic and non-ceramic finds.

4.3.1 **Ceramic Finds**

The ceramics were studied from the standpoint of vessel functions. Thus, the ceramics were seen as vessels particularly made to serve specific purposes. The study did not seek to explain the technical aspect or variation of pottery morphology, composition, decoration and crystalline structure of the vessel walls. Therefore, an analysis of the mechanical performance characteristic of the completed vessels which affects their effectiveness for performing various functions was not attempted.

It was possible to relate vessel shape and size to use because coastal pottery traditions present a useful case for several reasons: First, the coastal community is a society with mixed subsistence base of fishing, grain cultivation, livestock keeping, hunting and gathering; hence pots were presumed to have been for domestic functions. Second, the ceramic assemblage is relatively simple, consisting almost exclusively of globular vessels, carinated vessels, open bowls and necked vessels. Third, coastal pottery has received considerable culture - historical attention (Wilding, 1977; Horton, 1984; Mutoro, 1987; Abungu, 1989) as well as attention from the standpoint of vessel function (Wilson, 1979; Mutoro, 1979; Donley, 1984; Wandibba & Barbour, 1989).
At both Ungwana and Shanga, the vessels were divided into 4 broad based functions, viz, cooking, serving, drinking and storage or medicine pots.

Cooking Vessels

These people had a variety of vessels for cooking. And these appear to have been consistently blackened - a sign that they were used over fire. At Ungwana they ranged from carinated pots/bowls, necked pots, long and short round-bottomed bowls, narrow-mouthed bowls to beaker-like vessels (Appendix V, VI and VII). It was surprising that hole-mouthed, restricted bowls and spheroidal bowls were not present in the Ungwana collection. These are common cooking pots found among the coastal settlements today. The cooking vessels were of various shapes. There were shallow bowls with rims slightly outcurving or incurving rims with flat slightly raised bases, some had globular shapes with very short necks or without necks at all. Some (especially carinated) were constructed with distinct ridge or an edge round the middle or the upper body (Appendix Va).

At Shanga the cooking vessels were mostly necked and carinated vessels. The necked vessels were also of various shapes and sizes. There were small, medium and large ones. The types included straight necked, wide-mouthed, necked, deep necked bowls and large necked pots or bowls with inturned rims (Appendix X and XII a and b). The carinated vessels at Shanga were pots/bowls with district ridge or edge around the middle or upper body (Appendix XVI). They have near-flat or conical shapes which make them suitable for use as cooking vessels. At Shanga there were some imported
carinated vessels, but they were rarely or not used at all for cooking - these had no signs of soot blackening. Other types of cooking vessels also found at Shanga were hole-mouthed pots (Appendix XI).

Their shapes (cooking pots) are suitable for use over portable clay stoves, mofa ovens and between three cooking stones. Portable clay stoves and mofa ovens were common at Shanga but were missing at Ungwana. The incurring shoulder, short neck with wider mouth shapes is conducive for boiling, stirring and mixing of food in the course of the cooking (Wilson, 1978; Mutoro, 1979). Such foods may have been maize meal, millet meal, porridge ("uji"), meat, fish, vegetables, rice, "ugali" etc.

Serving Vessels

At Ungwana these were vessels with maximum diameter at the mouth or lip in most cases. Some have restricted rims, while others may have some slight concavity or carination. The walls of some are convex with flat bases, shallow and mostly open. They appear in several sizes; small, medium and large. The types include carinated bowls, shallow bowls and open-mouthed vessels (Appendix VIa and b).

The shallow open shape of these vessels make them suitable for serving meals rather than cooking. Food was probably served in a large bowls and members of the family ate communally from the same bowl. The medium size open-bowls may have been used by medium-sized families for a similar purpose as the large ones. The small
bowls on the other hand may have been used for soup (relish) or sauce. They were also likely used to serve separately the members of the family particularly children to avoid quarrels during meals.

The large-mouthed open bowls appear to have generally been multipurpose; they may have also been used as "basins" for washing hands before and after the meals. They were probably also used in the preparation of coconut and spices (pepper etc.) which are cooking additives in most Swahili foods (Ndiiri, 1992). Today, these types of vessels are used also for collecting nazi and tuwi and also as mortar for crushing pepper and preparation of greens.

A part from the local earthen ware, some imported ceramics were also used for serving meals. Brightly glazed bowls of sgraffiato and early Islamic monochrome were used as serving plates/dish but certainly not for cooking.

At Shanga the serving utensils also comprised open bowls and carinated vessels. There were also local and imported vessels of this category. The local open bowls included wide-mouthed rim bowls, small globular bowls, deep unnecked bowls and flat bowls (Appendix XV). They were of varying sizes; the wide-mouthed and flat bowls were probably used for serving food. The function of the deep unnecked and small globular bowls was not clear, but they may have been used for boiling liquids, serving or for washing hands before and after meals. The flat bottomed bowls may also have been used as mortar for the preparation of spices as may have been the case with the Ungwana open bowls.
Their foreign counterparts were sessanian islamic bowls, white glazed and black-on-yellow islamic tradition bowls, islamic unglazed bowls, "siraf" unglazed shallow open bowls and straight sided bowls. The imported ceramics were not used for cooking but for serving meals probably on special occasions, or to serve guests. The imported ceramics may have also been used by the upper and middle class inhabitants who could afford to buy them. Some of the local carinated bowls appear to have been used as serving vessels rather than for cooking - they were shallow and open-mouthed with no traces of use over fire.

Drinking Vessels

At Ungwana these included small vessels with rims slightly straight or divergent sides. Their bases are round, flat, or slightly convex. The lips are mostly outturned. Their beaker-like or mug-like shapes make them suitable for drinking water, porridge and milk rather than for serving or cooking. Examples of drinking vessels from Ungwana include bowls with fish-tail lips and ring base, bowls with flat or trumpet-shaped lips, beaker-like vessels, bowls with ring or hollowed bases, flat or rounded rims and straight sides (Appendix VIc and d). At Shanga the small-sized jars/pots may have been used as drinking vessels (Appendix XIIa, b, and c).

Storage Vessels

These were of varied shapes. There were those with spherical body with conical base and restricted necks. They had globular bodies, tall necks and out-turned or
incurving rims. At Ungwana this category was represented by large or high shouldered globular jars/pots and small neckless jars (Appendix VII and VIII).

The storage (globular) vessels at Shanga included both local and imported ceramics, e.g., the polychrome tradition, islamic unglazed, "siraf" unglazed, Indian tradition, porcelain and stoneware. The vessels were not used over fire. A part from the globular vessels, at Shanga the large necked pots appear to have been preferred more as storage vessels rather than for cooking - they rarely showed traces of soot in their exterior (Appendix XIII and XIV).

The jars/pots with short necks may have been used to store liquids, like water or milk. Those jars/pots with incurving or restricted rims could have been used in dispensing water, its wider mouth allowed greater access to the liquid.

Some of these globular vessels a part from being used for water storage were probably also used for storage of grains and important family goods. But these globular vessels were highly suitable for water storage - their restricted necks kept evaporation down. Their large shapes was a convenient cooler of water. These historical functions still persist to date (Ndiiri, 1992). It is important to note that the imported ceramics were only used as serving plates, drinking vessels and storage. None of them had signs to illuminate cooking.

Mofa Ovens

Mofa ovens are clay stoves ("mzinga") which were used for cooking. Food was placed in the large cooking pots (Jungu la mofa) and cooked on ovens. The "Jungu la
Mofa" were particularly used for baking "mofa" bread. Mofa bread is made of millet, sorghum and maize flour. The mofas were sandwiched with honey or ghee. The bread may have been eaten with milk or with meat and fish. These ovens are still in use in some Swahili households in the area of the north Kenyan Swahili coast, but strangely missing in the Ungwana excavations.

Some of the pots were used for medicine ("vyadawa"). But the large carinated pots ("chunga"), short-necked pots with wide mouths ("Kaango") and "Jungu la mofa" were used for cooking on fire. The cooking vessels had a round-bottomed shape which made them to balance between three stones over a fire or on a clay stove. In preparation of rice the cooking pot may have been covered using a lid ("Kia") as it is the case today. In its final stage of preparation charcoal is put on the lid to make the rice at the top dry and brown (Donley, 1984).

4.3.2 Non-ceramic Finds

These are food-related metal and stone implements. They are also represented in the Ungwana and Shanga excavations and include, iron knives, arrowheads, nets, net sinkers, lines, traps, grinding stones, iron-fishing hooks, metal axe, coconut scarper, and metal sheet bowls. We did not come across or have information pertinent to statistical data or quantities of these finds. This is useful information which needed to be stated for comparative interpretation.
Iron Knives

At Ungwana they are heavily fragmentary and too few to enable one to make any firm generalization while at Shanga twenty-five fragment were found. But they were probably used during butchery, cutting, skinning of animals as well as harvesting crops. They may have also been used for sharpening digging sticks (Mutoro, 1979). (Appendix IX, XVII)

Metal Arrow heads

Arrowheads would suggest hunting of game (buffalo, dik-dik, bush buck, oribi, etc.) for food. These wild animals are represented at Ungwana and Shanga. But the fact that these arrows were used for defence is also a possibility (Stigand, 1913:41; Coupland, 1938; Mutoro, 1979). (Appendix IX, XVII). It should be noted that at Shanga only one arrowhead which resembled a projectile or a point was recovered; it was therefore not easy to make assumptions about their usage at Shanga.

Local net, Net Sinkers and Lines

These were used for fishing in the sea. It was one way of catching marine and river foods. Net-sinkers were made of stones and some of baked clay and were specifically found at Ungwana. Local nets and lines were found at Shanga and their number could not be ascertained because they were very fragmented.
Grinding Stones

The grinding stones were worn on the grinding surface. This would suggest that pestles were used to grind cereals such as sorghum, millet, maize etc. The grinding stones may have also been used for grinding other things such as snuff, red ochre, soil to make paint and some medicinal plants or softening of meat by pounding processes. A part from the querns, mulers were not recognised nor identified; mulers are vital in grinding of cereal grains or seeds. The grinding stones were only found at Ungwana and not at Shanga.

Iron hooks

They were used for fishing alongside the nets. It is also possible that those hooks without barbs were used as tongs to suspend storage vessels or food out of reach from the children, cat and rats (Appendix IX). We did not observe or recognise other types of fishing harpoons (e.g. wood, bone, stone barbs or serrated sickles) a part from iron hooks. No iron hook was found at Shanga.

Metal Spears

The spears were probably used for hunting the wide variety of game which have been discussed in the direct evidence. These equipment may also have been used in warfare. Again here, their fragmented nature could not allow their figures to be found/known. Metal spears were recovered only at Shanga not at Ungwana.
Traps

Traps were recovered only at Shanga and may have been used for fishing along side nets and lines; they were also likely used for trapping wild animals. The writer in the course of this study observed the practice of trapping wild animal to be a way of killing game in the north Kenyan Swahili coast. This may also have been the case with Shanga inhabitants. The number of the traps was unknown.

Axe

It was only the Shanga excavations that yielded this find. Like arrowhead, only one piece of a metal axe was found and it was difficult to make generalizations about it. It appears the axe was of multipurpose function and may have been used for breaking firewood or trunks to make charcoal used in the mofa ovens. The axe may have also been used to break the long and large animal bones into smaller pieces which could fit in the cooking pots (Appendix XVII). The practice of breaking long or large bones of animals during slaughter is a common practice along the coast and elsewhere in Kenya. The axe may have also been used for clearing the forest for cultivation and probably more significant than a "Jembe". Shifting cultivation requires more an axe than a hoe.

Coconut Scraper

One fragment was found at Shanga. It may have been used for removing the inner part of the coconut. Coconut juice may have been an additive in the Swahili foods in the past as it is today. Even the coconut scraper is still in use in most Swahili
households today and it is called "mbuusi" (Appendix XVII). The Ungwana remains yielded no coconut scraper.

**Metal Sheet Bowls**

Six fragments were found at Shanga. They were dated to Ca. 14th century A.D., i.e., towards the end of the settlement. These were serving dishes or frying pans - some of the dishes were open and flat. There were also wooden plates or vessels for serving. No metal sheet bowls or wooden plates were recovered from Ungwana.

4.4 Conclusion

In this chapter an attempt has been endeavoured to discuss the dietary habits of the inhabitants of Ungwana and Shanga as shown in the archaeological evidence. The archaeological evidence discussed are Direct evidence and Indirect evidence: combined with ethnographic observations (where necessary) and documentary evidence, it is clear that the local environment allowed the Ungwana and Shanga inhabitants to pursue several economic strategies for their survival. The bulk of their diet was obtained by tapping resources within their surrounding. For example, land was used for farming, hunting and agriculture; the sea for fishing. Their sources of food was thus varied and diverse and they changed their economic strategies overtime. This may probably explain the diversity of the historical evidence about the coastal diet (see chapter 2).
From the faunal analysis a number of specific site conclusions can be drawn. The inhabitants of Ungwana relied for their protein on cattle, chicken/birds, sheep and goats and this was supplemented with wild animal meat in different quantities. Chicken/birds offered the greatest supply of protein throughout the periods except in the last period when it was overtaken by cattle. Monitor lizard, dugong and turtle were not regular or reliable sources of protein: monitor lizard is represented only in periods I, III and VI; dugong was consumed in periods II, III and V and turtle in period II and VI only.

The Ungwana inhabitants appear to have preferred to slaughter young animals because a great quantity of the teeth surfaces did not show signs of eruption - young animals offer tender meat and their bones are easy to break. It may also be that the mature animals were kept essentially for milk and ghee. For the wild stock hunting appears to have been indiscriminant - both young and old animals were killed whenever it was possible.

In period II most of the sheep/goats were larger in size than the usual size (sheep/goats bones together with other ungulates fall under size 2). It is probable that these inhabitants during Ca. 1150-1200 A.D. preferred to slaughter he-goats (or males) or/and rams. He-goats and rams are bigger than she-goats and sheep usually. However, this needs more research.

Period II middens were also associated with burials or the disposal of dead bodies. The association of the dead with midden is extremely a non-islamic culture of burying the dead but strangely found within an islamic town. May be these were not muslim dead bodies.
Fishing and fish eating was popular at Ungwana. Their bones are represented in large quantities and well distributed throughout the layers. Other marine resources such as shells and crab were also present and probably eaten. Fishing was done either in the sea or around the Tana mouth using nets, handlines and hooks.

At Shanga fish consumption was the most popular in all the periods except during period V and VI and it was consumed in great quantities right from the inception of the settlement till its decline. Despite being the most popular source of protein throughout the periods, there was a downward trend in its quantity. The decline in fish consumption with time may have been due to increased meat consumption. It may also mean shifts in economic strategies or changes in food type preferences.

Meat was obtained from both domestic and wild animals. The domestic animals included cattle, goats and sheep. The wild stock included dik-dik, suni, duiker, and bushbuck. Sheep/goats and cattle consumption maintained an increasing trend from the time they were introduced (i.e. period II) to the decline of the settlement. Chicken/birds, wild animals, turtle and dugong consumption was not regular and constant; they were consumed in fluctuating quantities (Table 5). The quantity of game meat was dismal compared to the meat from domestic animals. Dugong was only introduced in the diet during the fourth period of occupation. Camel appearance are dated to Ca. 1100 A.D. (period IV) and persists upto the decline of the settlement.

The analysis of local and imported ceramics at Ungwana and Shanga reveals that there were specialized vessels, viz., cooking, serving, drinking and storage vessels. The cooking vessels had signs of post-fire soot blackening. The serving vessels were wide,
shallow and open in shape (see also Wandibba and Barbour, 1989). Proteineous foods (meat, fish) were either stewed or boiled and eaten alone or with a meal made from maize, sorghum, millet or cassava. The imported utensils were mostly used as drinking and storage jars/pots and/or as serving plates by the well-to-do in the community.

The tie of ceramics to diet has indicated that the ceramic vessels form an important component to the adaptation of the population to the local environment. Overseas vessels entered Ungwana and Shanga but the initial shapes and forms persisted to the decline of the settlements. Some local pottery shapes and forms later resembled the imported ones but largely remained African. At no stage in the history of the two settlements did the imported vessels outnumber the locally produced ones: There were about 10 tons of pottery recovered at Ungwana and out of this 95% were local ware. At Shanga out of the 100,000 potsherds studied 3/4 were local ware. The trend in the same utilitarian shapes have been shown to be continuing to the present (Ndiiri, 1992).
5.0. DISCUSSION AND CONCLUSION

5.1. Discussion

The archaeological data studied included faunal remains, ceramic and non-ceramic finds. There was no direct evidence for floral remains: for example, in the form of pollen grains, carbonized or unburnt seeds from both the Ungwana and Shanga excavations. However, other findings such as the presence of the ceramics and non-ceramic finds, were used as indirect evidence. Thus combined with documentary accounts and ethnographic materials as well as observations an attempt was made to discuss crop foods consumption in the Swahili diet. It should, however, be borne in mind that the absence of direct floral remains may be due to prevailing unsuitable preservation conditions (acidic soils and humid conditions) in the area. Its proximity to the Indian Ocean may have made the coastal soils acidic. However, the evidence for iron use and probably iron knowledge among the inhabitants of the coastal settlements should be viewed as a step towards efficiency in terms of food production. An additional argument for the possible lack of direct factual floral evidence may be that since these Swahili communities were for all practical purposes fully urbanized, may be they probably preferred to just acquire the necessary cereal crops for consumption through barter system from their more agrarian neighbours rather than practically produce some themselves. After all, you surely don’t have to own or keep a cow in
order to drink or consume milk and its resultant products. This is actually what rural-urban dichotomy implications are all about.

In this study ceramics have been used to refer to those implements/vessels or equipment made of clay and permanently hardened by heat and glazing to make them durable, i.e., pottery. These were made into cooking vessels, serving, drinking, storage and medicine pots. By understanding the domestic functions of the different vessels it was possible to reconstruct the way of life, food, cooking and eating habits of those who used them.

The present state of ceramic functional studies as archaeological evidence for diet, however, reveals a need for investigation of mechanical performance characteristics of pottery. This is to suggest further studies on the ceramic vessels and should also embrace petrographic methods so as to establish: the suitability of a given vessel flow as a container used to hold or dispense some kind of material, the suitability of a given vessel slope for use as a storage container, cooking, serving, transporting, heating or cooling containers, the suitability of the vessels to withstand physical stress entailed in its use without failure over a reasonable period of use. Resistance to failure is conditioned primarily by composition, cross-section shape and crystalline structure of the vessel walls as well as the whole vessel shape (Braun, 1983). In theory then, these mechanically sensitive attributes, when their mechanical meaning is recognized, provide
the archaeologist with the means of explaining ceramic technical variation and mineral composition as opposed to merely describing it.

Local pottery outnumbered by far the imported ones. For instance, at Ungwana where about 10 tons of pottery pieces were recovered, 95% represented the indigenous wares, while at Shanga, there were about 100,000 potsherds; and, well over three-quarters (3/4) belonged to the indigenous wares. The vessel forms evidently changed over time as the coastal population exploited the varied environmental resources.

Ndiiri (1992) has shown that the shapes, forms and domestic functions of the vessels continue to date along the coast. Continuity in the same utilitarian shapes and forms may mean; one, continuity of the same basic population; two, addition of new population or replacement of an old generation with a new one. But ceramics should not be taken here to represent a people. One population can replace another one but still maintain the culture of the replaced population. Thus, the premise that pottery represents people, and that related assemblages can be seen to either represent the same or related peoples by fact that they share similar traits when used, is not always true. Change in the ceramic form and shape may mean change in economic strategies or relationship between and within communities or individuals, or it may simply reflect new technological ideas.
Non-ceramic evidence is used here to refer to those objects that appeared to have been used for domestic purposes but were not made out of clay. These were objects made of metal, stone and/or wood, such as grinding stones, metal plates, iron knives, arrowheads, axes, iron hooks and so on. The ceramic and non-ceramic evidence was a useful indicator of socio-economic and cultural adaptation to a diversified local environment with varying potentials (see chapter 3). The diverse environmental potentials offered an opportunity for involvement in different economic strategies: there was the sea and the reefs which provided marine resources and a large fertile mainland which was suitable for agriculture. The forested mainland also allowed for hunting activities. River Tana was fully utilized for fishing and transportation activities by both the Coastal and interior peoples. The diverse economic strategies were evidently exploited at different times or simultaneously by the Swahili inhabitants together with the different communities living in the coastal region.

The inhabitants of Ungwana and Shanga were mainly of the Swahili stock. The dietary habits of the inhabitants of these two early settlements have close similarity to that of the contemporary Swahili people living in the north Kenyan Swahili Coast in particular, and the Kenyan Coast in general. The architecture and settlement plans of Ungwana and Shanga resemble those of the modern Swahili towns. This is, however, not to deny the presence and interaction with the other hinterland peoples and foreigners. What we are saying here is that the Swahili inhabitants were the main and dominant group in the coastal settlements.
The conversion of the coast to Islam did not undermine nor superimpose itself on the already existing African coastal culture. Islam brought taboos and beliefs about which foods to be eaten ("Halali") and those prohibited ("Haram") but did not overhaul the already existing dietary habits. There was instead modifications within an African setting.

It is perhaps important, at this juncture to point out that this work confirms the hypotheses about the Swahili diet initially set forth. The objectives were met and the ecological model employed in the study was fulfilled. However, the analysis of ceramic evidence tended to call for functional studies, but generally there is no antagonism between the use of a functional dimension and an ecological model. This is because the vessels or tools were used as a means of adaptation or to exploit the environment and at the same time the environment contributed to the type of the former.

I have therefore attempted to analyse the archaeological findings in an archaeological perspective up to the 17th Century A.D. By no means can we say this study has been exhaustive on the subject of diet. Nevertheless, the study goes along way to contribute some knowledge towards the understanding of the Swahili culture and diet.

5.2. Summary and Conclusions:

In this thesis the diet of the Swahili people on northern Kenya coast, its trend and quantity, palaeoenvironmental changes and ecological niche’s have been discussed.
In this study we have used archaeological, documentary accounts and ethnographic observations to draw a picture of the early Swahili diet. The analysis in chapter 4 show that the Swahili communities at both Ungwana and Shanga exploited varied food resources. At Ungwana and Shanga most of the Swahili communities' protein was obtained from domestic animals, but with an emphasis on wild game meat which was used as supplements.

At Ungwana the consumption of domestic animals (cattle, goats, sheep and chicken) was more popular than wild game meat, but wild animals (buffalo, dik-dik, bush buck, steenbok, bush duiker, oribi) were fair protein supplements. Other protein supplements at Ungwana were turtle and dugong but these appear to have been rare foods. The porcupine was also not spared.

During period V at Ungwana there was a great reduction in cattle and sheep/goats bones in the assemblage. This reduction was compensated for by an increase in wild animal bones, dugong, turtle and chicken. The reduction in the quantity of cattle and goat/sheep bones could mean that people kept these animals but preferred them for milk and ghee in most cases. Or it could also show a change in economic strategy towards the exploitation of marine resources, intensification of hunting and poultry keeping.

At Shanga fish offered the greatest supply of protein. Protein supplements were turtle, dugong, wild animals and chicken. While at Ungwana, chicken consumption was the popular source of protein, at Shanga fish was the most preferred. And there is strong evidence that the inhabitants of Shanga relied upon marine resources as the mainstay of their source of protein right from the inception of the settlement to its decline (except during periods 5 and 6). This conclusion contradicts Mark Horton's observation that the
inhabitants of Shanga did not rely much upon marine resources (see Horton, 1984; Horton and Mudida, 1993).

At both Ungwana and Shanga domestic animal consumption was more popular than wild game meat consumption. The domestic animals were slaughtered when still young; probably a curling practice. The mature or old animals may have been kept for milk, ghee and for reproduction. It may also be that young animals were preferred because they offer tender meat and their bones are easier to break and chew.

The study has revealed that the Swahili people are virtually unique among the peoples of East Africa in their possession of a maritime culture. Their adaptation to marine and terrestrial resources, coupled with a growing involvement in trade networks with the interior of Eastern Africa and across the Indian Ocean, may have enabled them to establish settlements along the East African coastline and offshore islands. The other people to share in this spectacular culture were/are the Mijikenda and the Pokomo, who together with the Swahili belong to the north eastern Sabaki Bantu language cluster.

The Swahili and their close relatives did not depend entirely on the sea. They also carried with them an Eastern Bantu inheritance of mixed farming, grain cultivation and livestock keeping (Nurse and Spear, 1985; Allen, 1993). Hunting and gathering were also a component in this inheritance and therefore an eclectic economy and varied diet of the Swahili. It is not surprising that hunting and gathering play much the same role in rural Swahili communities (e.g., Faza, Takaungu) as it does among other Eastern Bantu (e.g., the Mijikenda, the Pokomo etc).
The Swahili diet is little different from those of their present hinterland counterparts (the Mijikenda, Pokomo etc.), and the range of "Halali" (permissible) animal foods is very similar except the Islamic "Haram" (prohibition) upon pork. Birds, and herbivores are generally fair games; carnivores, vultures, primates, reptiles, and amphibians are not. The Swahili, have few dietary restrictions except the Katwa clan on Pate Island who did not eat fish. Their anomalous behaviour in this respect demands an explanation. It seems likely that this is an inherited practice which has survived among the Katwa clan on Pate Island. Today the taboo has been discarded by the Katwa clan members living out of the Pate island.

5.3. Recommendations:

1. Archaeologists working on the Kenyan coast need to undertake indepth research on floral evidence in this region. They should come up with new or more methodological frames such as froth flotation and other related methods.

2. Archaeologists interested in the early coastal diet should explore possibility of using other available direct evidence such as human skeleton remains, stomach contents, coprolites etc. Also, the extent to which inscriptions and drawings on the walls of the early settlement structures (Shanga, Ungwana, Mwana and Fort Jesus) offer information about diet or at least subsistence strategies, for example, by depicting hunting activities, fishing, farming, trade and so on.


Stratigraphic Sequence at Ungwana

<table>
<thead>
<tr>
<th>Period/Stratum</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period VI</td>
<td>ca. 1500 - ca. 1600 A.D.</td>
</tr>
<tr>
<td>Period V</td>
<td>ca. 1450 - ca. 1500 A.D.</td>
</tr>
<tr>
<td>Period IV</td>
<td>ca. 1350 - ca. 1450 A.D.</td>
</tr>
<tr>
<td>Period III</td>
<td>ca. 1200 - ca. 1350 A.D.</td>
</tr>
<tr>
<td>Period II</td>
<td>ca. 1150 - ca. 1200 A.D.</td>
</tr>
<tr>
<td>Period I</td>
<td>ca. 950 - ca. 1150 A.D.</td>
</tr>
</tbody>
</table>
## APPENDIX II

### Stratigraphic Sequence at Shanga

<table>
<thead>
<tr>
<th>Period/Stratum</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period VII</td>
<td>ca. 1400 - 15th century A.D.</td>
</tr>
<tr>
<td>Period VI</td>
<td>ca. 1300 - ca. 1400 A.D.</td>
</tr>
<tr>
<td>Period V</td>
<td>ca. 1200 - ca. 1300 A.D.</td>
</tr>
<tr>
<td>Period IV</td>
<td>ca. 1100 - ca. 1200 A.D.</td>
</tr>
<tr>
<td>Period III</td>
<td>ca. 1000 - 1100 A.D.</td>
</tr>
<tr>
<td>Period II</td>
<td>ca. 900 - ca. 1000 A.D.</td>
</tr>
<tr>
<td>Period I</td>
<td>ca. 800 - ca. 900 A.D.</td>
</tr>
</tbody>
</table>
Period by period percentage of the Total Bones studied at Ungwana.
APPENDIX IV

Period by Period Percentage of the Total Bones studied at Shanga.
a. Carinated cooking pot  
Orifice diameter = 12 cm.

b. Cooking pot with incurving shoulder  
Orifice diameter = 17 cm.

c. Short neck cooking pot  
Orifice diameter = 12 cm.

d. Short neck cooking pot  
Orifice diameter = 16 cm.

Scale 1 : 0.5
CERAMICS FROM UNGWANA

a. Wide mouth serving bowl with wide or trumpet shape top.
   Orifice diameter = 20 cm.

b. Wide mouth serving bowl with wide or trumpet shape top.
   Orifice diameter = 17 cm.

c. Beaker-like drinking vessel and probably a cooking vessel.
   Orifice diameter = 16 cm.

d. Bowl with ring base, probably a drinking vessel.
   Orifice diameter = 28 cm.
a. Short neck storage water pot and probably used for cooking.
Orifice diameter = 12 cm.

b. Short neck storage water pot or cooking pot.
Orifice diameter = 14 cm.

c. Short neck storage or cooking pot.
Orifice diameter = 10 cm.

Scale 1 : 0.5
a. Necked storage pot.
Orifice diameter = 16 cm.

b. Neckless storage pot.
Orifice diameter = 22 cm.

Scale 1 : 05
NON-CERAMIC FINDS FROM UNGWANA.

Iron Knife

Arrow Head

Arrow Head

Iron Hook

Scale 1:1
a. Large necked cooking pot.
Orifice diameter = 12 cm.

b. Medium necked cooking pot.
Orifice diameter = 11 cm.

c. Small straight necked cooking or storage pot.
Orifice diameter = 8 cm.

Scale 1 : 0.5
CERAMICS FROM SHANGA

APPENDIX XI

a. Large-hole mouth cooking storage pot.
   Orifice diameter = 26 cm.

b. Small-hole mouth cooking.
   Orifice diameter = 15 cm.

c. Cooking pot/bowl with shnecct and thickened should.
   Orifice diameter = 19 cm.
a. Large necked jar.
Orifice diameter = 15 cm.

b. Medium neck jar.
Orifice diameter = 12 cm.

c. Small drinking jar.
Orifice diameter = 8 cm.

Scale 1 : 0.5
CERAMICS FROM SHANGA

a. Open-mouthed jar/pot.
   Orifice diameter = 18 cm.

b. Globular jar.
   Orifice diameter = 20 cm.

c. Neckless jar.
   Orifice diameter = 18 cm.

Scale 1 : 0.5
a. Restricted necked jar/pot.
Orifice diameter = 2 cm.

b. Restricted necked jar/pot
Orifice diameter = 24 cm.

Scale 1 : 0.5
a. Deep serving bowl.  
Orifice diameter = 28 cm.

b. Wide mouth serving bowl.  
Orifice diameter = 21 cm.

c. Open serving bowl.  
Orifice diameter = 26 cm.

d. Serving dish.  
Orifice diameter = 8 cm.
a. Carinated serving or cooking bowl
Orifice diameter = 20 cm.

b. Carinated serving or cooking bowl
Orifice diameter = 18 cm.

c. Carinated cooking pot.
Orifice diameter = 16 cm.

d. Carinated cooking pot.
Orifice diameter = 16 cm.

Scale 1 : 0.5
NON-CERAMIC FINDS FROM SHANGA

APPENDIX XVII

Coconut scraper

Axe

Point or arrow head

Arrow head

Iron knife

Iron knife

Iron knife

Scale 1 : 2